



VI.
ATLANTIC RAGAGAR

Seaweed, pollution,
and the voice of the sea

Extract from: Gilles Aubry, *Sawt Bodies Spaces*.
Sonic Pluralism in Morocco, adocs 2023.
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VIDEO

Atlantic Ragagar

by Gilles Aubry

2022, 31'43", HD video

<https://arbor.bfh.ch/18255/2/ar.mp4>



VIDEO

The Binding Effect

by Gilles Aubry

2021, 15'51", HD video

<https://arbor.bfh.ch/18257/2/be.mp4>



R'bia (red seaweed) in Sidi Bouzid, 2019.

- Good morning!
- Good morning, my son! What do you do, my son?
- I collect seaweed.
- Ok. Are you making an experiment?
- Yes. I'm researching this species.
- Ok, so next time, try to tell them what we're enduring here.
- I know about that. You get 10 dirhams per kilo of red seaweed.
- Exactly! My son, speak about us to our King, if you can.
- Yes, I know, it's gonna be alright.
- How are you going to communicate this message to the King? It's always the powerful ones who make profit! And us, we only have God to help us! We make big efforts, always, every day we end up exhausted. It's always the same price we get, and they always pay late. They give us a hard time to pay us those cents! Always a hard time! But, ok, in the end it's God who helps us. What can we do about it! Me, I'm a daughter of the sea! Hey my son, I was born here you know! El Jadida, that's us! My son, you know that without the sea we would starve! Nothing, it's hard, no work for our children! How do you think we've survived so far? We only have the sea for us! All we're asking for is health and security. May God protect our King!¹
- Fatima B., Sidi Bouzid, 2018

¹ Conversation recorded and translated from Moroccan Arabic into French by Younes Boundir in 2018; English translation by the author. Fatima B. is a fictive name. All of the local interlocutors in this chapter are given fictive names in order to preserve their anonymity.

The lines above are an excerpt from a conversation between Younes Boundir, a biologist at Marrakesh Cadi Ayyad University, and Fatima B., a seaweed collector from El Jadida. Like dozens of other women, Fatima B. comes every morning at dawn

to harvest red seaweed in Sidi Bouzid, a beach near El Jadida on the Moroccan Atlantic coast. She plucks seaweed with her bare hands and puts them inside a cotton ball around her waist, half immersed in seawater. After five to six hours of tedious work, she has collected enough seaweed to fill up a bigger fabric bag; she walks back to her home in the suburbs with the 10 kg bag on her head. She gets five dirhams per kilo of fresh seaweed from a *laabara* (weigher), a local intermediary in the seaweed business. Fatima makes about 1500 dirhams a month (approx. €140) through her activity during the seaweed season (May to October), barely enough to survive. While women of all ages collect seaweed directly on the shore, men too participate in this economy by snorkeling in shallow waters. Red seaweed (*gelidium*) is used as a gelling agent in the food and pharmaceutical industry, also known as *agar agar*. Gelidium has been harvested in Morocco since the 1950s and production is currently booming.²

The conversation with Fatima was recorded in August 2018, during my joint field trip with Younes Boundir to Sidi Bouzid. Boundir and I had met the year before in Marrakesh and started an exchange about his scientific research in “biomonitoring” on the Atlantic coast. By observing and measuring the effects of aquatic pollutants on various seaweed species, he explained, seaweed can be used for monitoring anthropic pollution. Seven locations on the coast served as monitoring stations, to which Younes Boundir regularly traveled in order to make measurements and observations. Sidi Bouzid beach has very low levels of water pollution and seaweed can grow in near to ideal conditions (Boundir et al. 2019). The place

² Morocco's current gelidium production represents 82 percent of the global market, in contrast to 23 percent in the 1960s (Santos and Melo 2018).







functioned as a “control station” in Boundir's comparative study of several locations. Sadly, the situation is very different further south on the coast, where the pollution generated by industrial activities seriously impacts biodiversity: phosphate fertilizer plants run by the OCP Group in Jorf Lasfar and Safi; fish canning plants in Safi; industrial and tourist harbors in Safi and Essaouira; and a brand new coal power plant south of Safi. At these stations, Younes Boundir's measurements showed high concentrations of phosphorus and heavy metals (lead, cadmium, chrome, and copper). Through additional biochemical and physiological analysis of brown seaweed samples, Boundir also demonstrated the sensitivity of this species to pollutants, explaining its scarcity at some of the industrial sites.

Younes Boundir's research provided a concrete entry point into industrial culture and ecology on the Atlantic coast, with obvious socio-political implications. I was especially curious about the perception by local people of the complex interactions between industrial activities and the ecosystem. It was not clear in the beginning how this could connect to my own research on sound and listening. Yet I was keen to engage in an inter-disciplinary exchange with Younes Boundir, given his personal interest for social and artistic matters. Our collaboration started with a series of interviews by Boundir on the coast during one of his research trips, which he recorded using one of my sound devices. People, often fishermen, were generally eager to talk to him, especially in the proximity of industrial waste pipes in Safi. They mentioned the impact of pollution on fishing, the diminishing of marine biodiversity compared to previous decades, and their difficulty to survive economically under these conditions. More generally, people complained about the lack of job opportunities in the region and shared their feeling of being abandoned by the state. Whenever the population had made demands to the authorities, they were usually disregarded. Listening to these recordings together with Younes Boundir triggered conversations between us about people's lives and concerns on the coast, about his own scientific work on marine ecology, and about how we could explore together the links between these two fields.

THE *ATLANTIC RAGAGAR* PROJECT

In August 2018, Younes Boundir and I took a first research trip to El Jadida, leading to a series of observations, encounters, and interviews with local

people, like Fatima B. Following this experience, our collaboration took the form a joint artistic research project titled *Atlantic Ragagar*. For Younes Boundir, the main objective was to study the impact of pollution on the marine ecosystem and to publish scientific reports that could serve the community for exerting pressure on the authorities.³ In order to preserve marine biodiversity, he declared, it is necessary to regulate the toxic emissions of industrial activities. Emission norms do exist in Morocco, yet are often not respected. Industry spokespeople argue that the sea has the capacity for self-regeneration, but this capacity is limited, he added. Seaweed is very sensitive to pollution and the range of interactions between species is a good indicator of the degree of pollution. When the sea is affected by pollution, people are ultimately also impacted via the chain of ecological interaction. The sea does not speak, Boundir commented, but it can *tell stories*, and one simply has to listen to them. The “voice of the sea, that’s the best topic,” he concluded. To me, as a sound artist and anthropologist, the “voice of the sea” also sounded like a good starting point. I was curious about the possible meanings of “voice” in this context, and how it could be apprehended through listening, considering the seemingly mute nature of seaweed and pollution. If the voice of the sea raises the possibility of an “extra-human, ecological voice” (Pettman 2017), how is it constituted, and by whom? How can notions such as nature, culture, subjectivity, and embodiment be re-examined through such a voice, from the perspective of sound studies and eco-criticism? How best to approach and render audible the voice of the sea through art practice on the Moroccan Atlantic coast? These questions informed the



Red seaweed (gelidium), research documentation by Younes Boundir, 2018.

³ The statements by Younes Boundir reported in this text stem from an initial conversation between us recorded in Marrakesh in April 2018, as well as from additional exchanges during our collaboration between August 2018 and September 2019.

⁴ So far, my collaboration with Younes Boundir has led to the following realizations: the installation *Unsound Traces* (Aubry 2018) as part of the 2018 Casablanca Art Biennale; a presentation by Younes Boundir including some of our research material at the *Qanat* exhibition at Le 18 in Marrakesh in November 2018; a joint performance as part of the *Qanat* program in March 2019; and the joint exhibition *Atlantic Ragagar* (Aubry and Boundir 2021) at the art space La Chambre de l’Art in Bruxelles in September 2021. See <http://www.earpolitics.net/projects/atlantic-ragagar-exhibition-program-2021>.
⁵ The film *Atlantic Ragagar* can be accessed via the following link: <https://arbor.bfh.ch/18255/2/ar.mp4>.

project with Younes Boundir over the following three years, leading to a series of research trips and public presentations in art contexts.⁴ In September 2019, Imane Zoubai joined us in Sidi Bouzid, then a student at the National Institute of Visual Arts (INBA) in Tetouan. Our exchange with her led to a series of interventions in Sidi Bouzid and Safi, which we video-documented. These research materials are featured in the film *Atlantic Ragagar* (Aubry 2021).⁵

In this final chapter, I focus on the aural dimensions of human-environmental interaction on the Moroccan Atlantic coast. I consider previous accounts on ecological voices by composers and scholars, and how listening can become a modality for attuning to extra-human alterity. Based on findings from the *Atlantic Ragagar* project, I describe a *natural voice of the sea*. This voice emerges in scientific imagery and contemporary visuality, in close relationship with the technocratic modes of industrial exploitation and neoliberal management of “natural resources.” The natural voice of the sea is therefore an abstract and bodiless voice. I further identify an *intimate voice of the sea*, which relates to the long history of co-domestication between local populations and marine life in the area. As part of this history, people recognize a certain autonomy and agency in marine life. I discuss yet other instances of the voice of the sea, which emerged through our joint research methodology. This involved a number of artistic experiments and participative interventions, revealing a plurality of perspectives on aurality and ecology. These aspects highlight new dimensions of sonic pluralism. Because seaweed and pollution cannot be heard directly, our listening principally relied on our capacity to



Top: Mosaic wall representing industrial culture in Safi, 2019.
Bottom: Imane Zoubai and Younes Boundir in conversation with a seaweed collector in Sidi Bouzid, 2019.



relate *affectively* to the world. Sonic pluralism points to the necessity to “unreduce” (Latour 2004) the conceptual borders between the different senses, therefore also questioning the relevance of disciplinary borders between visuality and aurality. Another aspect pertains to the collective and participative dimensions of the research with Younes Boundir, Imane Zoubai, and other people in El Jadida and Safi. Knowledge emerged through repeated exchanges between the participants, giving way to a temporary “community of practice” (Wenger 1999). Sonic pluralism is manifested here in the collective expression of knowledge and affect, framed by a set of common concerns about social and environmental justice. The chapter concludes with an examination of the relations between the micro-political dimensions of our research and wider socio-economical and environmental issues in Morocco. This raises questions about how human rights can be extended to include extra-human lives, without automatically depoliticizing differences in positions between humans themselves. If our project did not produce any clear and definitive answers to this problematic, it nevertheless allowed for alternative forms of public engagement and reflection on socio-environmental justice, as I argue in conclusion.

ECOLOGICAL VOICES IN THEORY

In the field of sound studies and sound art, the voice of the sea historically refers to discussions on “soundscapes” (Schafer 1977; Thompson 2013; Helmreich 2016; Ingold 2007), “acoustic ecology” (Wrightson 2000), and “acoustic territories” (LaBelle 2010). The possibility of “extra-human voices” (Pettman 2017) raises additional questions about the subjectivity, presence, and agency of extra-human beings such as animals, plants, and other creatures and entities. These questions further resonate in current debates and artistic positions that explore the “ontological co-formation” of human and extra-human beings, in contrast to traditional “naturalist taxonomies” that place humans above all other species and organic and non-organic matter generally (Tiainen 2017). Together with other members of the World Soundscape Project (WSP), the composer Richard Murray Schafer (1977) was a pioneer in addressing the ecological significance of sound environments. If he recognized in them “indicators of social conditions,” he nevertheless maintained a strict division between man-made and extra-human sounds. With the term “soundscape,”

he arguably established a tendency to aestheticize extra-human sounds as objects of human contemplation. Vilem Flusser (1979) is another thinker who examined natural sounds from the perspective of natural-cultural entanglements. As part of his phenomenological experimentation, he describes environmental sounds, such as wind, in terms of “voices that call us” and as “a someone to whom we must respond.”

For Dominic Pettman (2017), sonic environments do not only “interpellate us” as subjects, but also “constitute us as ontological beings.” While scientific survey projects often tend to present changes in ecosystems in terms of a “visual voice of nature,” listening intently to environmental sounds offers a way of engaging with “a more radical alterity than our own species.” This requires suspending our habitual assumptions in order to attend to such voices. Some of these assumptions regard the exceptionality of humans in *having* a voice, or their self-granted habilitation to “paternalistically” give a voice to other species who cannot speak for themselves. When considering at which point a sound can become a voice, Pettman suggests that “voice” does not represent an “intrinsic characteristic of any given sound.” It is much more a “transitive event,” resulting from the *affective* experience of the listening subject. In order to be considered a voice at all, extra-human manifestations must therefore resonate intimately with the listener, or else they are experienced as noise or static. Ecological listening also pervades the work and writings of composer Pauline Oliveros (2005). Through her theory-practice method coined “deep listening” she invites the listener to attend to her connectedness to “the whole environment and beyond.” “Listening is survival!” she adds, in reference to the capacity of extra-human beings to “completely” register human presence. She alludes to the “symbiotic” and “limitless” dimensions of listening, which can extend beyond mere acoustic perception. If ecological voices are immanently singular, this does not prevent humans from experiencing alliances, sympathies, and harmonies with other species through the very process of “co-constitutive listening” (Pettman 2017).

THE NATURAL VOICE OF THE SEA

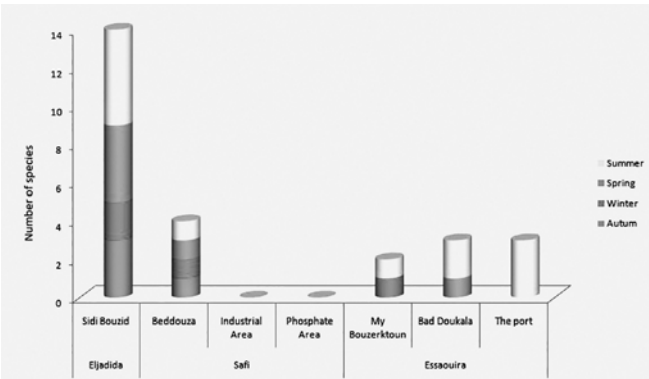
My examination of the possible meanings of the voice of the sea on the Moroccan Atlantic coast begins with seaweed, which took on an important role in our project from the start: first, as a biological object as part of



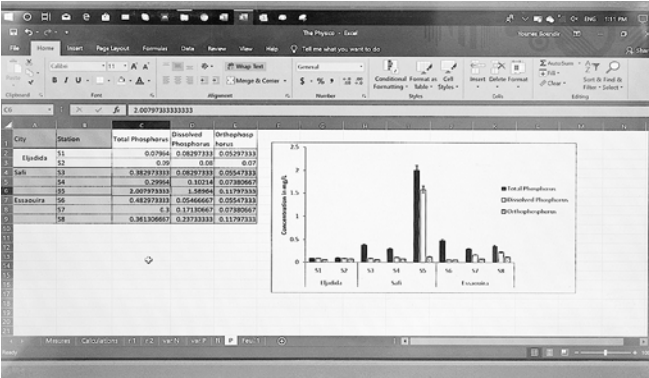
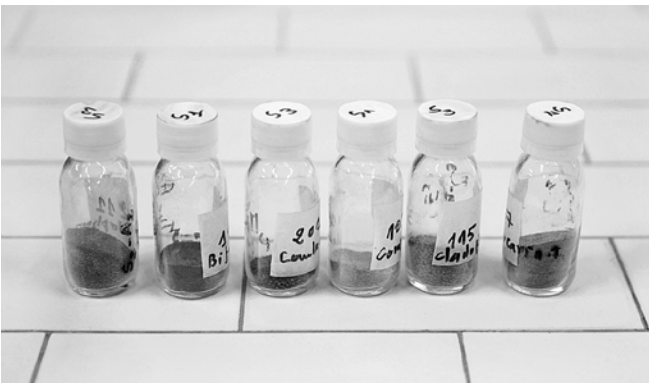
Fig. 327. — *Gelidium corné*.

Hand drawn gelidium,
date unknown.

Younes Boundir's research on macro algae; second, as bio-monitoring agent indicating anthropic pollution; third (for gelidium especially), as a “natural resource” that is used locally and exploited for the benefit of transnational extractive industries; and fourth, as co-partner in our artistic experiments and interventions. Seaweed was at the center of our attention during our first trip to El Jadida in August 2018. We started in Sidi Bouzid, Younes Boundir's control area. We often called it the “seaweed paradise” because of the site's excellent water condition. Roaming the beach during the low-tide hours in the morning was a very enjoyable experience, as we could closely observe dozens of seaweed, shellfish, and bird species. Younes Boundir taught me many things about marine biology and seaweed especially. After some time, I was able to recognize some of the most common seaweed species in the area, identifying them with their Latin name: green algae (*codium* and *ulva*) in the supra-tidal zone, large brown seaweed (*laminaria*) in the medium area, and red seaweed (*gelidium*) in the infra-tidal zone. Boundir also introduced me to scientific terms pertaining to the modes of intra- and inter-species interactions, and to their milieu: biotope, substrate, symbiosis, epiphyte, saprophyte, biocenosis, and other terms, which at first sounded like a poem by Donna Haraway, but ultimately helped me to better apprehend the complexity of seaweed life. We also shot underwater videos of seaweed populations using a GoPro camera. In Sidi Bouzid, and lower on the coast in Ifitry, we ended up with remarkable images showing the abundance of seaweed in these locations, where interactions between species are clearly visible.



Seaweed samples and visual data produced by Younes Boundir as part of his research on pollution biomonitoring on the Atlantic coast of Morocco, 2018.



6 Introduced by the French in Morocco during the interwar period, the fish industry employed 6000 workers in twenty-four factories and eight canning shops in 1932, mainly in the Atlantic ports (Irbouh 2001). This activity was further developed after the country's independence in 1956, and Morocco remains today the largest global producer of canned sardines, with 115,000 tons exported in 2009 (Caquel 2015). Following a severe drop in fish abundance in the Safi region in the 1980s, the coastal fleet transferred its activities southwards, and the production in this area has been in decline ever since (Atmani 2003). Owned by private companies such as MIDAV (formerly SAREX), fish factories in Safi still seasonally employ about a thousand people, of whom 90 percent are women.

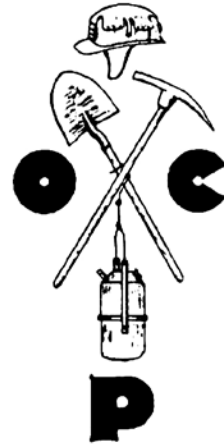
7 Created in 1920 during the French occupation of Morocco, the company Office Chérifien des Phosphates (OCP) is the first phosphate exporter in the world, a leader on the phosphoric acid market, and a major producer of solid fertilizers (Boyer and Scotto 2013). With about 20,000 employees, the OCP Group is the largest employer in Morocco, exploiting four mining sites and several chemical plants in the country. In 2008, the OCP was privatized, with the Moroccan state remaining the only shareholder. The Moroccan King nominated a new director. Thanks to neoliberal restructuring, the company was able to quadruple its profits since 2009 (5.4 billion dirhams in 2018).

Later on, we visited other monitoring stations in industrial areas further south on the coast. The first station was a fish canning zone in Safi, host to factories that produce various types of canned sardines and mackerel.⁶ Because an important part of the production has been relocated elsewhere on the coast since the 1980s, many factories have stopped their activities in Safi. Industrial infrastructures are worn out, and the factories discharge their polluted waters through a large pipe directly into the sea. At this station, Boundir measured significantly higher concentrations of lead and cadmium in the seawater than at the Sidi Bouzid control station (Boundir et al. 2019). The water was visibly blurred by organic particles, preventing the light from penetrating below the sea level and causing an excessive oxygen concentration in the water. High concentrations of heavy metals were also found at a third station near a chemical plant owned by the OCP group specializing in phosphate derivatives.⁷ Apart from lead and cadmium, Boundir's measurements revealed a strong presence of phosphate elements in the seawater. In this case, too, polluted water from the plant was, and still is today, discharged directly into the sea, resulting in a yellowish tinge of the water. Accumulations of phosphogypsum, a radioactive by-product of fertilizer production, were visible along hundreds of meters on the shore. The underwater shots in the film *Atlantic Ragagar* show a complete absence of seaweed in this area, and reveal the turbidity of the water caused by phosphogypsum particles.

In a recent article on the ecological status of Morocco's Atlantic coast, Younes Boundir and his peers evaluate the effects of aquatic pollutants

on a brown macro-algae species (Boundir et al. 2019). Their data demonstrate that pollution significantly affects the algae's physiology, and that this species tends to disappear in highly polluted areas. Scientists often metaphorically refer to a "voice" of nature, Pettman (2017) remarks, for example, in ecological survey projects that render changes in the planet's ecosystem visible through long-time monitoring, using measurements, data visualizations, and maps. A similar *natural voice of the sea* emerges in Younes Boundir's scientific study on the interactions between seaweed organisms, anthropic pollution, and seawater on the Atlantic coast. Boundir's article does not go as far as to claim the necessity to *reduce* pollution in the name of biodiversity and environmental justice. He simply sticks to the facts, as is customary in scientific journals. Here, the *natural voice of the sea* is not grounded in affective perception; it is a product of scientific methodology.

According to Irmgard Emmelhainz (2015), the visibility of contemporary scientific imagery turns images into "signs of cognition," that is epistemological products that are "indifferent" to the viewer. Through machinic vision, images have become scientific, managerial, and military instruments of knowledge—and thus of capital and power. This involves "a passage from representation to presentation," through which images no longer relay the subjects of "belief" or the objects of contemplation, instead coming to be perceived as "an extension of the world." Through data visualization and scientific imagery, seaweed, pollution, and seawater are therefore *naturalized* into abstract objects of study, whose interactions and evolution can



Top and right: Visual logos of the OCP Group between 1920 and 2000.



مجموعة م ش ف
Groupe OCP

be modeled and predicted. "Water" is indeed a "modern abstraction," which emerged alongside and was made legible through agricultural, hydroelectric, and potable-water management regimes (Helmreich 2016). Similarly, the *natural voice of the sea* creates the conditions for the technocratic management of marine life and pollution, between industrial exploitation and ecological preservation. State programs for fishing and agricultural management, such as the "Plan Halieutis" and the "Plan Maroc Vert" produce abstract visualizations and maps of natural resources (Hamouchene 2019). Through such plans, the "natural voice" is further constituted through principles of industrial exploitation, environmental regulations, and strategies of economic predictions. As a sonic metaphor for contemporary modes of technocratic management and exploitation of natural resources, the "visual voice of nature" therefore always posits a subjectless, *external* observer. This "free-floating bird's eye" mirrors the present moment's "ubiquitous condition of groundlessness" (Emmelhainz 2015). Groundlessness characterizes the Anthropocene, as we lack any ground on which to found politics, social lives, or a meaningful relationship with the environment.

Phosphate, as a product of marine sedimentation and a source of industrial pollution, further complicates the web of interactions that constitutes the *natural voice of the sea*. In the language of corporate groups such as the Moroccan OCP, phosphate is naturalized as a plentiful resource that is discovered, extracted, transported, refined, marketed, applied, and perhaps recycled (Jackson 2016). As part of this narrative, phosphate-based fertilizer helped foster radically

increased crop yields and the feeding of a large and growing human population. Phosphate extraction was central to the agrochemical “Green Revolution” of the 1950s, and became a key force in the spatial production of postcolonial nation states like Morocco. In the case of the Bou-Craa mines in Western Sahara, phosphate extraction was secured through military intervention by the Moroccan state. The mines were turned into a military camp traversed by sand walls, stones, and barbed wire installed to protect them in a context of the rising Polisario Front insurgency.

For a long time, industrial companies considered pollution to be a regrettable—but in the end negligible—collateral damage of their activities. Things started to change in recent decades with the increasing ecological awareness of international institutions. Global players such as the OCP group were now expected to demonstrate their ecological commitment as part of Corporate Social Responsibility (CSR) programs. The OCP group is today “a pioneer in ecological development,” we are told (Donsimoni and Labaronne 2014). As part of its ambitious “green” program, the company announced a series of territorial redevelopment projects, amongst them a “green mine” in Khouribga, a “green city” in Benguerir, and the “green rehabilitation” of the industrial zone in Safi . Despite these announcements, the yellow tones of phosphogypsum predominate in the coastal landscape near the OCP plant in Safi, as our 2019 video documentation attests. Instead of green rehabilitation, the massive pipe discharging the OCP plant's toxic sewage has been recently replaced by an underwater pipe, thereby simply camouflaging its presence. Further down the coast, a new coal power plant was recently built on a plot of land owned by OCP, raising serious concerns by local activists about possible health and ecological consequences (Abir 2015). Aside from seawater pollution, air pollution caused by the OCP plant's toxic fumes is a health risk for Safi's inhabitants. A high rate of pulmonary and cancerous diseases have been reported in the area in a publication by the NGO Swissaid (2019). Although—or because—measurements by the NGO's experts have shown a significant concentration of toxic substances in the air near the OCP plant, the Moroccan authorities have contested the study's validity.

The polemic surrounding industrial pollution in Safi—OCP and local authorities versus OCP workers, inhabitants, and NGOs—creates a crisis for the presumed objectivity of scientific observation. Each side claims its own truth about pollution, with different results and interpretations. Because



Current visual logos of the OCP Group (2020).

the Moroccan authorities have so far refused to publicize their own results, and because industrial pollution continues to affect the ecosystem and people's health in Safi, the OCP group's ecological program appears as a mere greenwashing operation, far from genuine ecological and social commitment. The lack of consensus progressively turns the *natural voice of the sea* into a cacophony, further diffracting into a proliferation of digital images across social networks. How can we transform our relationships with such a multiplicity of diverging points of view, Emmelhainz (2015) asks, to provide a heightened sense of place? How to allow for collective autonomous subjectivation, and a new sense of politics and image? A partial answer can be found in the actions taken by street protesters. In 2011, dozens of people occupied a square in front of the OCP administration in the mining town of Khouribga, and blocked the phosphate transport to and from the chemical processing plant in Safi (Bogaert 2015). In 2014, the Moroccan Human Rights Organization (AMDH) organized a demonstration in Safi against the construction of the new coal power plant. OCP employees have started an initiative in for better health conditions at work, despite the company's frequent attempts to intimidate the participants of such actions.⁸

Through social protests, the *natural voice of the sea* becomes much more “vocal” and audible, full of “grain” (Barthes 1977) and affect. As Emmelhainz (2015) reminds us, the crisis of visibility in the age of the Anthropocene is, however, deeper. Groundless seeing brought about by “communicative capitalism” turns images into information, sensations, and intensities without meaning. As we are increasingly causing

⁸ See https://web.archive.org/web/20161021115455/https://www.huffpostmaghreb.com/2016/06/23/opc-maroc_n_10632622.html



Top: Dried seaweed on a laabara plot, Sidi Bouzid, 2019.
Bottom: Seaweed drying on a rooftop in Sidi Bouzid, 2019.



numerous extinctions, we also extinguish that which makes us, and supports us, as humans. If it is urgent to recover human vision from “passive observation” as an “act of seeing,” listening can also provide ways to meaningfully reconnect with the world. Listening itself is not immune to machinization, as the implementation of algorithmic listening technology through voice assistants illustrates.⁹ In ecological practice, however, listening offers the possibility for a “deep” (Oliveros 2005), “intimate” (Pettman 2017), and “intentional” (Kapchan 2016) attunement to alterity.

THE INTIMATE VOICE OF THE SEA

During our time in Sidi Bouzid, Younes Boundir and I witnessed people's seaweed harvesting activities on the beach. We had no difficulties starting conversations with them, provided that we were not filming. After a couple of days, our presence was generally well accepted. We became more familiar with a local *sense* of the sea by following people's daily interactions with the marine environment. Drawing on Steven Feld's (2017) “acoustemological” method, I describe these forms of interaction in terms of “embodied,” “relational,” and “cumulative” knowledge. A different *voice of the sea* emerges from the local ways of engaging with place and space-time, which I call an *intimate voice of the sea*. This voice diverges from accounts that tend to naturalize environments into abstract systems and models, or into static objects of aesthetic contemplation. People's knowledge of the sea and

⁹ As an example, machinic listening is implemented in Apple's “Siri” and Amazon's “Alexa” voice assistants.

its creatures in Sidi Bouzid mirrors domesticatory links between them. These relations include various dimensions: spatial, temporal, bodily, semantic, socio-economical, administrative, and others, which I briefly review here. As I already suggested, people are not only *agents* in this process, but also *objects*, constituted as humans by their environment through interaction (Stépanoff and Vigne 2018; see also Chapter V).

The people we encountered in Sidi Bouzid worked as seaweed collectors (mainly women) and fishermen (exclusively men). For all of them, making a living from collecting marine resources meant that they adapted their own existence to the ocean's cycles and rhythms, as well as to meteorological conditions. Some of them could tell us the state of the sea by listening from afar and by observing the sky. They had a precise sense of the ocean water level, knowing exactly when to go to the beach to collect specific kinds of shellfish or seaweed. On the Atlantic coast in the summer season, low tide oscillates between 4 and 10 a.m., with an offset of approximately 30 minutes per day. It is therefore not uncommon for women to start their harvesting activities in the sub-tidal zone at night, provided there is enough moonlight. While men sometimes wear diving suits for snorkeling in the fresh Atlantic waters, the women cover their entire bodies with several layers of cotton clothes, including headscarves. Older women pick seaweed washed by the ocean onto the beach; younger ones spend hours half-immersed in seawater, tearing seaweed with their bare hands. This means hours of exposure to water salinity, intense sunlight, and quickly changing air temperatures. Their activities are further complicated by the presence of strong waves and sharp rocks covering the ground. The women have told us that physical injuries are common and include painful bites by moray fish. People's bodies are marked by the marine environment in many ways; they are physically exhausted, altered, burned, sometimes injured, or even healed by it.

Until thirty years ago, people caught fish directly by the shore. Nowadays, they have to sail several miles out to sea to find catch due to the OCP phosphate plant's activities 10 kilometers down the coast. Certain species of fish feed on seaweed, and this in turn affects their taste, someone explained. A drop in seaweed population therefore leads to a drop in fish abundance. Fusia S., a free diver, witnessed a diminution of gametes in seawater that are necessary for seaweed reproduction, leading to a drop in certain species in the area. Pollution also affects the texture of the fish meat and the rigidity of their bones, a fisherman told us. These examples highlight local common





knowledge of marine life, including reproduction cycles, food chains, and the impact of pollution. They also suggest that people in Sidi Bouzid are “made,” or “domesticated,” by the sea through continuous interaction and direct contact with the sea, and via their nutrition. People’s common knowledge gives rise to an *intimate voice of the sea*, which expresses interspecies co-dependence.

The domesticatory link between human and marine life on the Moroccan Atlantic coast also manifests in the language and cultural representations. Local names for large seaweed species often refer to familiar and terrestrial things, turning the marine environment into an extension of people’s domestic space: red algae (gelidium) harvested for industrial exploitation is simply called “r’biaa,” which literally means “the one like grass”; large brown seaweed (laminaria) is called “cinta” (belt, from the French word “ceinture”); and another brown species is called “fula” (bean). Similar analogies exist for fish and shellfish species along the coast, whose common names often evoke objects (spoon, knife), terrestrial animals (ram, jackal, dog), or human activities (blacksmith) (Lâtaoui 1999). For the anthropologist Romain Simenel (2017), vernacular naming practices in Morocco allow for social and semantic continuity between “domestic” and “wild” territories. In Berber Islamic “analogical” cosmology, these territories are symbolically related to “the world of humans” and “the world of spirits” (*jnoun*) respectively. These worlds are not conceptually separated, and interactions between them are frequent, often mediated by the spiritual power of Islamic saints. According to Laoust (1923), saints in the region were celebrated as protectors of fishermen, and numerous shrines can still be spotted on the coast. These traditions seem largely extinct, but remain part of the local collective memory. Mussels, in particular, are endowed with divine blessing and can be found on graves in cemeteries. Further north in Ain Diab near Casablanca, healing rituals related to the sea still exist today. Instructed by local healers, women stand through seven waves in order to benefit from a particular saint’s healing power (baraka).

The *intimate voice of the sea* echoes local culture, mediated through dialects, rituals, and other representations. Cultural representations in rural Morocco are often “more-than-cultural” (Aumeeruddy-Thomas et al. 2017). Far from being static, conceptual divisions between “nature” and “culture” figure a continuous process of interactions, to which extra-human and supernatural agents actively contribute alongside humans. The ontological

status of things, plants, humans, and animals therefore varies under certain circumstances, further troubling dichotomies such as local vs foreign, domestic vs wild, and human vs non-human (Simenel 2017). Local names for things mirror centuries of interactions between Berber and Arabic dialects in the region, as well as the more recent influence of French and Spanish presences (Lâtaoui 1999). In local administrative registers, commercial transactions are usually described with the French names of seafood products. The exploitation of marine resources is controlled by the authorities through a system of licenses, official seasons, and quotas. Unlike professional hookah divers who extract seaweed from the seabed in industrial quantities (two to three tons per day), the people we encountered in Sidi Bouzid generally operate on a much smaller scale. Women harvest on average 10 to 20 kg of seaweed per day, while free divers like Hicham A. are able to collect up to 100 kg. Compared to industrial techniques of extraction, their rudimentary hand-collecting technique appears more sustainable for the environment, not only in terms of quantity, but also because the seaweed “roots” (technically called holdfast) usually remain intact in the process, allowing the plant to grow again. Most of the people we met didn’t own licenses and engaged informally in harvesting activities. The ones with licenses are the laabara (weighers), intermediaries who buy up the collected seaweed and resell it to big companies, such as the privately owned Setexam. Their presence is signaled by large seaweed piles across the city, often guarded by several men. Once harvested, seaweed quickly mutates from a “creature of the sea” into an abstract economical resource, a process mediated by state legislations and transnational market prices. People in Sidi Bouzid often knew the exact current seaweed wholesale price, aware of the substantial profits made by brokers and bigger companies.

Women on the beach frequently complained to us about being paid very late by the laabara, and about the hardship of their existence. “Without the sea we would starve,” Fatima B. declared in her interview with Younes Boundir. While people in Morocco often rely on other family members for economic subsistence, she explained that even her graduated son did not find a job, alluding to corruption in the state administration. People in Sidi Bouzid engage in seaweed harvesting out of sheer economic necessity. “If we were all equal, I wouldn’t sit here doing this job,” Fatima B. said. Yet, living from marine resources has a long history on the Moroccan Atlantic coast, where fishing is traditionally a complement to agro-pastoral activities

(Caquel 2015). It is thus not necessarily the activity itself that makes people unhappy but an awareness that they suffer from a system that benefits a few privileged ones. People can no longer rely on the sea to make a living and find themselves heavily dependent on extractivist industries.

THE VOICE OF THE SEA IN *ATLANTIC RAGAGAR*

So far in this chapter, I have sketched two possible modalities of the voice of the sea on the Moroccan Atlantic coast. The *natural voice of the sea* figures an abstract voice, emerging through modern technological means of visualization, mapping, prediction, and management of life forms; it is a groundless voice, indifferent to its listeners. The second modality, the *intimate voice of the sea*, pertains to a local history of interaction between humans and marine life; this voice also manifests people’s continuous efforts to adapt to—and sometimes resist—the naturalizing force of capitalist extractivism. In order to attend to a more personal voice of the sea as part of the *Atlantic Ragagar* project, we had to compose our own research methodology. Researching together with Younes Boundir and Imane Zoubai became a collective process based on mutual learning. Our approach borrowed from feminist methodology, grounded in positionality, performativity, and micro-political interventions as possible ways of “becoming otherwise” (Neimanis 2016). I describe these experiments in the following sections to reveal the plurality of perspectives on aurality and ecology in our approach. Yet another voice of the sea emerges from these descriptions: a collective, polyphonic, distributed, troubled, interspecies voice—the *Ragagar voice of the sea*.

Our initial observations of marine life in Sidi Bouzid resulted in a series of video shots of seaweed, on the shore and underwater. We also documented some of the polluted sites: fish factories and the OCP phosphor plant in Safi; industrial discharge areas on the coast; and visible pollution, such as phosphogypsum sediments and fish residues in seawater. Compared to the charts, plots, and maps generated by Younes Boundir from physico-chemical measurements and data visualization techniques, the video shots represent complex environmental phenomena rather poorly. The underwater seaweed images are visually stunning, but they often remain distant from

their subject, as it is often the case in conventional nature documentaries. Our documentary approach became more successful as we were invited to people's homes in Sidi Bouzid. We recorded the presence of seaweed in domestic spaces and on private land plots. These images are featured in the *Atlantic Ragagar* video. They convey a sense of how marine life matters in people's existence, and how seaweed is turned into a resource as part of the local economy.

Alongside our documentation and interviews with local people, we needed to find ways of engaging more directly with coastal ecology. This was facilitated through Imane Zoubai's participation, a visual artist and vocalist from Fez. We met during the *Sakhra Encounters* in Moulay Bouchta, where I came to appreciate her talent as a singer and improviser. During our research trip in September 2019, we made a series of performative interventions at specific locations in Sidi Bouzid and in Safi. Informed by ideas and practices of "deep listening" (Oliveros 2005), "interspecies performance" (Tiainen 2017), and "trans-corporeality" (Alaimo 2010), the goal of these experiments was to explore possible forms of affective and material interactions with seaweed, seawater, and pollution. Our approach started with sound walks on the beach in Sidi Bouzid, as a mode of attuning to the site. While I was inclined to listen silently during those walks, Imane Zoubai frequently started humming melodies. Freely improvised, or borrowed from popular *melhun* sung poetry, these melodies responded to her feelings about the place, between "serenity and sorrow," as she said. We expanded this approach with a series of vocal interventions on the beach near the OCP chemical plant in Safi. We spent a whole day visiting the industrial area, interviewing people and documenting the visible signs of pollution on the shore. Imane Zoubai's vocal improvisations are featured in *Atlantic Ragagar*. Her voice acts like an affective sensor through which we can feel emphatically the trouble caused by environmental pollution.

Later on, we started including material elements in our interventions. We transferred small quantities of seawater from Sidi Bouzid to some of the polluted stations, invoking practices of care-taking, ecological maintenance, and healing. Elsewhere, we staged a respiratory exchange with seaweed. Using a plastic tube, Imane Zoubai exhaled carbon dioxide directly to the seaweed underwater. The gas was turned into oxygen through the plant's photosynthesis capacities, and fed in return into the air inhaled by Zoubai. For another experiment in interspecies performance, Imane Zoubai immersed

herself amongst seaweed in the sea, physically entangling herself with the plants' "bodily natures" (Alaimo 2010). While it is difficult to evaluate these experiments in quantifiable terms (what quantity of Zoubai's carbon dioxide was *really* turned into oxygen by the seaweed plant?), these interventions aimed to shift the conventions of taxonomic representation. Performative acts make room for an affect of mutual co-formation, supporting trans-species flows of becoming across the conventionally separated terms of human and non-human beings. These attempts are recapitulated in *Atlantic Ragagar*, along with the film's pressing question: How to listen to pollution and to its effects? Each sequence explores a different modality of listening and sounding: observation and attunement; vocal responses to pollution at specific locations; performative interactions with seaweed and seawater; poetic speech acts; and sound improvisations based on a graphic score representing Boundir's measurements of water pollution.

THE BINDING POWER OF AGAR POWDER

In order to make room for additional participants in our research, we organized a baking session with a group of women in Sidi Bouzid. We noticed that local people were often unaware of the culinary use of agar products derived from red seaweed. I brought a pack of agar powder produced by Lanuco, a German company working with Moroccan suppliers. Younes Boundir and I baked a small quantity of agar jelly sweets, good enough to be presented to some of the women busy collecting seaweed on the beach. The women were not very impressed with the taste and look of our sweets, but they showed an interest in the powder, and in its retail price in particular. Following these exchanges, one of the women agreed to host a collective baking session at her home. Our group included our host Hadja N., her sister-in-law Zora S., their colleagues Fatima H. and Fusia S., two younger women, and several children. After the introductions, we spent about three hours baking jelly sweets together, followed by a round of discussion, group pictures, and food tasting. It did not take long for the women to appreciate the culinary potential of agar powder. Each of them had their own approach to baking, adding ingredients to their preparations such as nuts, dried fruit, and cocoa powder. As we sat together at the end, the women were keen to

share information on their personal experience with the local seaweed industry, local uses of seaweed, food habits, marine ecology, state regulations, and various aspects of social life in the region. The session is documented in a second video, *The Binding Effect*,¹⁰ produced for the *Atlantic Ragagar* exhibition in Brussels. New knowledge emerged through this participative approach. This gave us a better insight into human-environmental interactions in the region, informing my account on the *intimate voice of the sea*. The session was very convivial, marking a significant step in our involvement with the local community. The binding quality of agar powder became effective not only on a chemical, culinary level, but also through the production of social interactions.

THE SHARED CONCERNS OF SONIC PLURALISM

Bringing agar powder to Sidi Bouzid closed the transnational circle of industrial production and consumption of red seaweed, aka gelidium, aka r'biaa. As its different names suggest, red seaweed can be known and experienced in different ways: as a scientific object of study, as a natural resource, as a domestic “companion species,” as an agent of marine biodiversity, as a culinary ingredient, and probably in a number of yet unrecognizable ways. A particular *Ragagar voice of the sea* emerged through our project, highlighting multiple ways of interconnecting with the environment, and of making sense of this experience. When Fatima B. introduced herself as “daughter of the sea,” this sounded at first like a



Baking experiments with agar powder, Sidi Bouzid, 2019.

¹⁰ The video *The Binding Effect* (Aubry 2021, 15:51) can be accessed via the following link: <https://arbor.bfh.ch/18257/2/be.mp4>

metaphorical kind of affiliation; a way for her to mark her cultural difference to foreign visitors. For materialist feminist authors, however, this expression can make sense *literally*. In her posthumanist account of human bodies as “bodies of water,” Astrida Neimanis (2016) insists on the constant embodied process of watery intake, transformation, and exchange—drinking, peeing, sweating, sponging, weeping. Our “wateriness” verifies that “we have never been (only) human,” both materially and conceptually. Stacy Alaimo (2010) follows a similar argumentation for “trans-corporeality,” which posits that the substance of the human is ultimately inseparable from the environment. Past and future bodies swim through us, and one is arguably always born from one’s own material environment, indeed a “daughter of the sea” (or son).

Overall, the *Atlantic Ragagar* project represents an additional step in my exploration of sonic pluralism. Because seaweed and pollution cannot be heard directly, this limitation encouraged a different approach to sonic experience: ways of listening *between* the senses, and *through* the different senses. Sonic pluralism is concerned with cross-modalities of perception, questioning the relevance of disciplinary borders between visuality and aurality. What “listening can do,” in this case, is to radically reconsider the limits of one’s own capacity to perceive and understand the world. Because voice is not an “intrinsic characteristic of any given sound” (Pettman 2017), interspecies listening very much amounts to letting extra-human manifestations resonate intimately with the listener or a group of listeners. Sonic pluralism, therefore, is not a “matter of facts, but a matter of concern” (Latour 2004), and of shared concern especially in our case. What started as an inter-disciplinary conversation between a biologist, a sound anthropologist, and a performance artist, progressively gave way to a collective learning process (see also Chapter II), involving more and more people, perspectives, and ways of knowing. The *Ragagar voice of the sea* is the voice of an assembly. This collectively distributed voice renders visible the plurality of standpoints from which it originates, without being reduced to one single, particular standpoint. By dwelling at the border between art, science, and ecology, our assembly generated an “extra-disciplinary” field of knowledge (Holmes 2008), framed by a set of shared concerns about social and environmental justice. Change was enacted socially through the collective production of knowledge and affect, as well as trans-corporeally through material interaction with the environment, turning perhaps each of us slightly more into daughters and sons of the sea.



Baking session with Hadja N., Zora S., Fatima H., and Fusia S., Sidi Bouzid, 2019. Stills From *The Binding Effect* by Gilles Aubry 2021.



THE MICRO- AND MACRO-POLITICS OF THE VOICE OF THE SEA

The *Atlantic Ragagar* project was an attempt to engage with environmental pollution and social realities from a ground level, informed by conversations and participative interventions with people in El Jadida and Safi. Our micro-political approach highlighted a number of tensions and frustrations in people's lives, related to unemployment, economical vulnerability, health insecurity, corruption, and a general lack of state support. As expressed by our interlocutors, socio-economic anxieties generally appeared more pressing than other issues, such as civil democratic rights, radical political change, or environmental justice. On a wider political scale, accounts of social protests in Morocco often stress similar distinctions between socio-economically motivated protests by the poorer part of the population, and more radical, political protests by human and ecological rights activists. The latter group is commonly associated with the *February 20* movement in Morocco, which emerged in 2011 during the "Arab Spring" uprisings in North Africa and the Middle East in (Hamouchene 2019; Bogaert 2015). The 2011 protests and riots in the mining province of Khouribga offer a telling example of the apparent fracture between protest movements in the Kingdom. Between February and August 2011, unemployed youth from the town occupied a square in front of the OCP local administration, blocking also the railway that transports phosphate to the port cities of Safi and Casablanca. Their action was joined later by protesters in Safi, who blocked the local OCP chemical plant. The protesters explicitly distanced themselves from the political goals of the *February 20* movement; they simply demanded more jobs and expressed their explicit desire to be recruited by the OCP: "In other countries they revolt for freedom, here we revolt for work" (Bogaert 2015).

The revolts in Khouribga and Safi are part of a long list of "small town protests" in Morocco since the early 2000s. Socio-economic struggles in peripheral regions are often fragmented, Bogaert (2015) notes, shaped by the local context in which they are embedded. Protesters oppose not so much the idea of neoliberalism as the negative outcomes it produces. During the heyday of the *February 20* movement, democratic activists did not succeed—neither in Khouribga nor in other places—in actively involving large parts of the working-classes, and the rural and the urban poor as a group, despite

the fact that some of their demands coincided. Whereas Hamouchene (2019) denounces a lack of political consciousness by many of the working-class protesters, Bogaert (2015) argues on the contrary that every economic struggle in an authoritarian or absolutist state is *de facto* political. While the *February 20* movement may seem in decline, the daily struggle in Morocco's small towns and villages continues. The Moroccan authorities are apparently very aware of the risks that such movements represent. This is evidenced by the heavy jail sentences pronounced against the leaders of the recent *Hirak* revolt in the Rif region.¹¹

The concerns expressed by people like Fatima B., Hadja N., Fusia S., and Hicham A. in Sidi Bouzid certainly feed a sense of injustice against the state and “the powerful ones.” Compared to the socio-economical costs borne by these people, environmental issues remain perhaps secondary. Our interlocutors in Safi and El Jadida never referred to dystopian ecological grand-narratives such as the “Anthropocene” or “climate emergency.” They nevertheless showed an ecological sensitivity, expressed in the recognition of their dependency on marine life, and in their awareness of the negative impact of industrial extractivism on their environment. During the COP22 climate conference in Marrakesh in 2016, the Moroccan authorities did not miss the opportunity to show the world their “deep” ecological commitment through projects such as the “green city” in Benguerir. They were also quick to blame their own citizens for not being enough “environmentally responsible,” a sense which should be better “taught” to people, according to some state representatives (Bogaert 2016).



Protests at the OCP administrative office in Khouribga, March 2011.

11 Following the massive uprisings in the Rif region between 2016 and 2017, the movement's leader Nasser Zefzafi was convicted to a 20-year sentence along with the other detainees, sparking waves of outrage and social discontent among Moroccans.

What the authorities did not mention were the effects of green grabbing, devastating mining pollution, the violation of social rights, and land expulsion, all in the name of “sustainable development.” When climate emergency turns into an emergency state of social control for the ruling elites, people run the risk of being consigned to an endless present of authoritarian capitalism (Demos 2019). Indigenous activists remind us that they are already “postapocalyptic;” the communities they represent have already lived through the exact socio-environmental breakdown that climate scientists now predict. Social injustice and environmental damages are the logical consequences of extractivism, which relies on capital accumulation through the brutal exploitation of natural resources destined particularly for export to world markets. In Morocco, contemporary extractivism is not limited to minerals and phosphate, it extends into activities that overexploit land, water, and biodiversity; it includes agribusiness, intensive forestry, industrial fish farming, and mass tourism (Hamouchene 2019). Overexploitation is facilitated by a society with limited democratic rights, and operationalized via neoliberal plans promoting private investment. In peripheral regions especially, people have suffered from extractivism since its introduction as part of the French colonial plan of natural resource exploitation in the 1920s. They have thus often witnessed the progressive extinction of local ways of being part of environmental life. As these populations are struggling to survive ever since, *they* might be in a better position to teach us how to resist the effects of ecological extinction eventually awaiting all of us.

The sit-in protest initiated by the villagers of Imider 300 kilometers south of Marrakesh represents a case in point in the field of resistance to neoliberal state oppression. Confronted with economic marginalization, the dangerous pollution of their grazing lands, and a severe water shortage resulting from the exploitation of a nearby silver mine, the villagers collectively decided to oppose the state-owned mining company (Bogaert 2016). Between 2011 and 2019, they implanted a permanent encampment on top of the hill to guard a valve and a water reservoir. A general assembly was established according to the local Indigenous model of decentralized decision-making, which incorporated principles of radical democracy and gender equality. In their pamphlets, the protesters rejected “sustainable development” in favor of “social, Indigenous (Berber-Amazigh), and environmental rights, including principles of community-based management of local goods (commons), such as water and land.” Although Imider remains by far an

exception in Morocco, their achievements may inspire other people to engage with protest in the future. According to Bogaert (2015), “small town revolts” demonstrate a gradual shift in the geographic center of gravity of social protests in Morocco from the urban centers to the peripheries. Even if they appear sometimes fragmented, short-lived, and limited in their scope of political demands, these actions nevertheless create their own space for different kinds of struggles to intersect, locally and via social media.

If the notions of “rights,” “justice,” and “commons” appear central to trans-localized forms of social struggles today, common understandings of these terms may, and perhaps need to, vary from case to case, in order to respond to the current crisis of “universal” democratic rights. I like to see the *Atlantic Ragagar* project as a rehearsing process for new modes of socio-environmental activism. Sidi-Bouزيد and Safi represent just two sites where the oppressive effects of global extractivism are felt particularly acutely, amongst many other places in Morocco and beyond. Rights, justice, and commons can quickly become abstract notions, if they are not grounded in concrete processes. The reality observed in Safi and El Jadida calls for the necessity to reconsider the relations between “human rights” and “extra-human rights.” This is certainly not an easy demand, and should better be addressed case by case through community-based decision-making, as in Imider. To conciliate human rights with extra-human rights indeed quickly appears problematic, if one is to avoid de-politicizing differences in positions between humans themselves. We entered this problematic through



Top: computer destroyed by protesters in Khouribga, March 2011.
Middle: OCP representative at a press conference.
Bottom: protesters gathering in Khouribga.

multiple ways—scientific, artistic, socio-anthropological, eco-critical, and community-based—, which resulted in a new, troubled *Ragagar voice of the sea*. This voice adds to the vocality of local protesters and activists, allowing for alternative forms of engagement. It speaks of our attempts to produce new, “shifting versions” of ourselves along the way, individually, collectively, and across species.

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