

Follow the action: understanding the conflicting temporalities of ships, river, authorities and family through distributed ethnography

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ABSTRACT

This article analyses the interplay between movement and stasis on Western European inland waterways by looking at four different orderings: navigational, regulatory, market, and intimate. These orderings are ongoing situated practices, which actors carry out in distributed socio-material assemblages. This was investigated through ethnographic fieldwork that was not only mobile, but also distributed across sites, both on land and the water. When following different actors, the key is to follow the action through which they are connected. Mobilising and immobilising ships is also achieved from land by control room operators, cargo brokers, family members and non-human actors like radar networks, geolocative AIS apps, and water level databases. It became clear that often actors need to give market orderings priority and rearrange their position in other orderings accordingly, which results in palpable pressure, manifested in different problems that all concern time. Skippers take risks to be just in time, to find resting time and to mediate asynchronous rhythms of loved ones on land, all the while maintaining critical spatio-temporal separation with riverbed, embankment and other ships. Media play an important role in the assemblages: they keep separate what would otherwise collide and connect to deal with separation.

ARTICLE HISTORY

Received 8 January 2020
Accepted 9 September 2020

KEYWORDS

Media; shipping; inland navigation; control room; work; ethnography

'There is an enormous shortage in skippers,' says Jerry,¹ a skipper on a 135 meter long container ship, as we leave the Duisburg (Germany) container terminal, heading for Rotterdam (field note 29-3-17). Jerry explains that inland navigation is a 'closed world, not many new people get in, also because it is hard to combine with a social life.' (ibid.) There was a time when many families lived on board, but most family members have left the ships and now have a home on land. Life on the Rhine has become solitary.

Much of the international transport to and from the Netherlands is done over inland waterways (Filarski 2014, 357) and in 2014 Dutch ships made up 60 percent of the cargo capacity of the entire Western European fleet (374). Between 1950 and 2003 the Dutch fleet went from 17.000 ships to under 5000, while the transported tonnage grew 64 times larger over the course of the last two centuries (359). So a relatively small group, in 2014 just over 17.000 people (374), is responsible for a significant economic contribution.²

This requires ships to be almost permanently on the move. By following not only actors but also practices across multiple sites this study reveals how navigating inland waterways is accomplished both on water and on land. Only through moving beyond this dichotomy the different problems of time central to inland navigation become visible.

Konstanzer Online-Publikations-System (KOPS)
URL: <http://nbn-resolving.de/urn:nbn:de:bsz:352-2-scto9fvgh1xx4>

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In 2014 Anim-Addo, Hasty and Peters in a special issue on sea shipping in *Mobilities* signalled a preference within mobilities studies for ‘mobilities ashore’ (2014, 337). What’s more, they determined the ‘absence of the sea from explicitly focused mobilities research’ (341). The same is true for inland navigation, rivers and canals. The remedy would appear to simply study these types of mobilities more, after all, the promise of the mobilities paradigm is that it ‘remedies the academic neglect of various movements, of people, objects, information and ideas.’ (Büscher and Urry 2009, 99) Here it is proposed that in order to counter this deficit sea and riverine mobilities should be studied more without replicating the land-water dichotomy that enabled the neglect in the first place. Anim-Addo, Hasty and Peters thought, following Steinberg (2013), that the explanation for the lack of scholarly attention for shipped mobilities partly lay in ‘the broader tendency in Western thought to see the sea as a lifeless backdrop, a realm distinct and distanced from the land.’ (341) Linton argues that water has been made into a modern abstraction, clearly separate from land (2010). While this conceptual hygiene is central to modern thinking, everyday practice is made up of hybrids (Latour 1993). Thus, not only land-water, but also nomadic-sedentary are oppositions often refuted by actual practices, as is the case with the practices presented here.

So, despite the fact that skippers live a radical mobile life compared to most, their mobility should not be essentialised. Rather, it is interesting to look at the blurry ‘interplay’ between ‘movement and stasis’ (Ramella 2018a, 336), and see how ‘the work of “mobilizing” and “immobilizing”’ (Büscher, Sheller, and Tyfield 2016, 490) happens both *from* land and from water, and *with* those on land and on water.

This study benefits from practice-oriented work done in adjacent fields, that explicitly goes beyond the land-water dichotomy. Laura Bear’s invaluable research on navigation of the Hooghly river by pilots covers both work on the river and the bureaucratic and capitalist structures that obstruct safer practices (2014, 2015). Ashley Carse has done great work on the Panama Canal, both on how the surrounding jungle became the catchment for the channel and thus nature became infrastructure (2012, 2014) and how the canal is navigated (2020). Especially in the first two studies Carse shows how any thorough understanding of the Panama Canal depends on both a land and water(way) perspective. Also relevant, in light of the land-bias, is the work done on deltas (Morita 2016; Krause 2017) that aims to be explicitly amphibious (cf. McLean 2011).

The mobilities studied in this article, were centred around waterways, but never stopped there, nor did the ethnographic fieldwork. The result is a three-pronged argument. One, it is shown how mobilising and immobilising is done through constant (re)positioning in four different orderings. Two, these navigational, regulatory, market, and intimate orderings are ongoing alignments of particular assemblages of human and non-human actors from across the land-water spectrum. And three, often actors need to give the market orderings priority and rearrange the other orderings accordingly, which results in palpable pressure, manifested in different problems of time.

This study connects with a whole range of studies that have shown what bearing the brunt of achieving mobility looks like. Taxi drivers’ bodies in North-American cities ‘recalibrate to the time of others as a significant condition of their labor’ (Sharma 2014, 20). In U.S. truck driving practices ‘risks are absorbed in drivers’ bodies’ (Snyder 2016, 124). Those on board of inland navigation ships absorb risk too, though it is not as dangerous or exploitative as seafaring (Abila and Tang 2014; Roberts et al. 2014; Ellis 2018; Jensen and Oldenburg 2019). As in trucking in the U.K. (Gregson 2018), sanitation is an issue in inland navigation, as wheelhouses generally don’t have toilets, these are downstairs, while most of the time skippers are alone at the helm.

Here, I follow this line of work, but also seek to complicate the object of inquiry more than has previously been done. To gather steam and come into motion, or seeking to moor while being on the move requires far more than mastering navigational ordering: it involves (re)positioning oneself in regulatory, market, and intimate orderings, with multiple temporal problems unfolding that have to be negotiated.

As mentioned in the introduction of this special issue, time has become one of the most valuable things to have. In this article I will highlight how the pressures the people in the field endure and

mitigate manifest themselves temporally: in addition to being (just) in time, actors try to save time by accelerating, or even steal it, by cutting a corner and make others go in reverse; some manage cunningly to create time; synchronous pockets of time are coveted, especially with loved ones, but (4G) network coverage is often lacking; waiting time is a challenge as the isolation of the depopulated wheelhouses is felt; while sharing time with people not on board requires careful planning and bodily risk.

In the ensuing section the methodology of this paper is introduced, after which an overview of the field sites is given. The empirical material is presented subsequently, in four sections, each containing several episodes. In the conclusion the different field experiences are brought together again, while the merits of the methodology in unearthing them, and the value of this paper for mobilities studies are discussed.

I. Navigating research: follow the practice

This article is built on three methodological steps, in which the key theoretical assumptions are anchored. The basic premise underlying all these steps is that mobilities are best understood as practice and therefore should be studied ethnographically.

(1) Empirically follow actors

The first step is to 'empirically follow' actors (Gherardi 2018). If actors are on the move, so too should the ethnographer be. This is a point that Büscher and Urry (2009) make, and is why I ended up boarding almost every type of ship on Western European waterways. However, at critical intersections and in ports traffic is coordinated from control rooms, which interact intensely with ships. This is how two strands of fieldwork presented in this paper are intertwined: wherever the journey on board went, control rooms were visited. As a result, an understanding of inland navigation emerged as much from a mobile as immobile perspective, as some intersections were studied from the control room before they were ever crossed on board.³ Moreover, actors were also followed in that most operators were skippers before, who sought a job on land, but still wanted to 'stay in touch with the water', as they often put it. Operators also actively encouraged me to do fieldwork on ships; and on two occasions operators brokered access to a ship.

(2) Action is distributed and dependent on media

Following actors made visible that they can move because of distributed activities. The critical action hardly ever happens just in one place. This is why sustained participant observation in one control room or on board of one ship would not have sufficed, as the key is to understand the interactions that make up inland navigation. Therefore, as a second step, a 'distributed' (Schubert and Röhl 2017) mode of ethnography was necessary. It became clear that maintaining a safe distance between hull, embankment and riverbed is an accomplishment across different sites, achieved through 'socio-material' (Braidotti 2002) assemblages.

Media play a decisive role in these assemblages. Media are defined here as technologies that actively mediate between different actors, radar being a good example. Through beams of microwaves it connects to other objects and helps identify other actors, which enables maintaining (minimal) distance. Media allow smaller margins and more risk, but not on their own. Like with a sonic depth finder, which critically mediates between skipper, hull and riverbed: it does not keep the riverbed and the hull of the ship separate by itself, a skipper has to act on the indicated distance, based on experience with an ever-changing river. Furthermore, it is important to stress that separation seldom means disconnection: in the case of the sonic depth finder distance is the measurement of the time that acoustic waves take to connect with the riverbed and return (cf. Borbach 2020). What it boils down to, especially in mobile nautical work, is that media enable the control of distances.

(3) Follow the practice of ordering

What is built through assemblages across all those sites? How does acceleration, temporisation, and mooring come about? Lucy Suchman's concept of 'orderings' best explains this (1997). An ordering consists of 'local interactions of participants' (ibid), and is particularly apt to capture both the temporal *and* the spatial aspect of the organization of mobility. Like with aviation or rail traffic, inland navigation is rife with critical events where spatio-temporal control needs to be achieved. More than 'arrangements', 'constellations', or 'networks', orderings emphasise a necessary spatio-temporal intervention, both in creating distance and drawing things near.

The notion is introduced in Suchman's seminal text 'Centers of Coordination' (1997). There she brought together many studies on control rooms (cf. Filippi and Theureau 1993; Harper and Hughes 1992; Heath and Luff 1992), including her own on airport Ground Operations rooms (Suchman 1993). Central to the organisation of mobility was the idea of 'ordering[s] from within' (Suchman 1997), which other studies on control room work had also emphasised (cf. Button 1992; Harper et al. 1997), though not as clearly integrated into a practice theory. Instead of an overarching external order, orderings only come about 'in the mundane reproduction of everyday activity' in which 'the social world is reiterated.' (Suchman, Gerst, and Krämer 2019) One might think a schedule is an external order, but even in aviation control rooms or train dispatching, in which schedules are important, mobility is not the result of merely executing a schedule (cf. Potthast 2008, 63), but of 'situated action' (Suchman 1997). A word that is often used in control room studies in this respect, which seems apt to describe work in the wheelhouse too, is 'ongoing' (Suchman 1993, 114; Heath and Luff 2004, 117).

In this article, two steps are made beyond Suchman's work and the control room discourse: 1) orderings are studied from both the mobile and immobile perspective, in the control rooms and on board of ships, and 2) the notion of orderings is expanded beyond the direct organization of physical movement.

The first point follows logically from prioritising the locale of interactions, which is more than a consequence of following the actors. It is about following ongoing situated action across sites. Yet this rarely happened in studies on centers of coordination and neither is it common for mobile ethnographies to substantially draw on immobile sites. There are four studies where the mobile and immobile perspectives were combined: Johan M. Sanne complemented his air traffic control fieldwork by joining the cockpit during flights while focussing on safety (1999); in her ethnography on labour, austerity, and infrastructure Laura Bear followed a variety of workers on and along the Hooghly river (2014, 2015); Benjamin Snyder studied both truckers and their dispatchers ethnographically as part of a broader interest in the disrupted workplace (2016); and Anna Lisa Ramella observed how rock musicians, both when on the road and at home, perform mobility and immobility through mobilization and immobilization practices (2018a, 2018b). All these studies informed mine, but especially Snyder and Ramella sensitised me to issues of coordination, rhythm and temporality. Still, none were as interested in the trajectory of ongoing situated action across sites, nor tried to capture how so many different actors manage to relate to each other on an everyday basis. To follow practices of ordering allows for scaling up and seeing how inland navigation works.

Therefore, the second step beyond Suchman's understanding of orderings is to consider other activities as orderings, as long as they are intertwined with the organisation of the physical movement and require active intervention. Although not as rigorous as 'grounded theory' the four different types of orderings – regulatory, market, and intimate, in addition to navigational – are rooted in what I observed in the field, and thus not an external order of my own that I projected a priori onto the field. It became clear that skippers and operators were not only involved in accomplishing navigational orderings, or to put it differently, navigational orderings were depending, both in constraining and enabling ways, on three other types of orderings.

Rounding up this section, it can be concluded that it is not enough to mobilize methods when trying to understand intricate modes of mobility like inland navigation, as will become apparent in the following sections. The three steps described above – follow actors, distributed across time and space, brought together in situated action – are part of one approach, which can be summarised as *follow the action*. Next, a short overview of field sites is given, after which four empirical sections follow, organised around different forms of temporality and told through different episodes observed in the field.

II. Overview of field sites

The first strand of ethnographic fieldwork was conducted on board four different Dutch ships sailing between The Netherlands, Belgium and Germany, mainly focussing on the Rhine and its tributaries and branches.⁴ The four boarded ships were selected in an effort to capture the diversity of commercial inland navigation:

The *Tigris* (193 x 22 meters) is a push boat and part of a fleet that is owned through a Dutch shipping company by a German steel producer. It transports iron ore from Rotterdam to Germany in up to six large steel barges lashed in front of it. It had a crew of seven with Pat and John as the captains.

The *Liberty* (135 x 11 meters) is a privately owned barge, as most ships are. The owners are a married couple, Rebecca and Rob, who were born on a ship themselves. They are chartered per voyage, so with the help of several agents they broker their next cargo while on the move, which is the dominant economic model.

The *Sunrise* (135 x 14 meter) is a container ship owned by William (and his brother), with Jerry as second skipper (who was quoted in the opening paragraph). They are time-chartered by an agency, which means that they don't have to broker their own cargo, and sail back and forth along the Rhine between Rotterdam and Duisburg. Time-chartered is financially stable, contracts often run for a year or more, whereas chartered per voyage profit and loss are hard to predict.

The *Porter* (110 x 11 meter), a tanker owned by Maria and Philip, is also time-chartered. Tanker shipping is subject to tight regulation: fire drills were frequent, electronic devices weren't allowed on deck (because they may ignite the fumes of the chemicals) and alcohol was forbidden on board.

The second strand of ethnographic fieldwork took place in a network of state-run control rooms, between (roughly) Antwerp, Rotterdam and Duisburg, from where waterway traffic is coordinated at the busiest sections and in ports. For this article, the Dutch control rooms along the Rhine are central. They are situated in Dordrecht, Tiel and Nijmegen, located directly where waterways come together. These control rooms are run by Rijkswaterstaat, the central 'infrastructuring' (Star and Bowker 2006) institute in the Netherlands.

III. Undetermined future: conflicting priorities in navigating rivers

In two episodes, it is explained how a ship comes from its current location to a near-future destination. Most actors involved want to know what the others plan to do, so that they can envision a near-future ordering in which there is place for them too. The future is undetermined in that there is no schedule and instead depends on situated action. This does not yet explain how a journey is completed, or how the cargo is found in the first place, but shows how ships move through small actions and what role the control room and other traffic plays in this. First it is argued that the most elementary orderings of navigations are made through the dual assemblage of accounting and steering clear, and then that at times a third position, that of the control room, is necessary to achieve this.

Episode one: accounting and steering clear – navigational ordering seen from the wheelhouse

This episode stands out as it does not directly cite from the field, but is based on a whole range of observations. This allowed me to formulate that at its most elementary level, navigation is the repetition of three steps in ever changing conditions: 1) separating hull-water-riverbed, 2) determining current position, and 3) connect current position to the near-future position.

The ordering of hull-water-riverbed depends on accounting for the water level, draft of the ship, and the width of the shipping lane. Most ships have a sonic depth finder, which is particularly important during low water and when a heavy cargo is transported and the ship lies deeper, and thus margins are slimmer. Otherwise skippers can rely on the shipping lane, marked by buoys and drawn on their digital maps. The shipping lane is kept stable by frequent dredging. At fixed, more shallow points on the Rhine, national nautical authorities permanently sound the depth of the river and communicate this to waterway users as the 'least measured depth'.

The second step in navigation is to determine the current position, which is a relatively casual task due to the familiarity of skippers with the river and the abundant access to visual markers on the river banks and beyond. This is best observed during a shift change, when the fresh skipper or helmsman climbs the stairs to the wheelhouse. During the day, with good visibility, the first thing s/he does is look around through the panoramic windows of the wheelhouse. At night or during thick fog the first thing they do when coming up is ask, and orientate by looking at the screen that displays the nautical map on which through GPS their position is displayed.

In contrast to navigation at sea (cf. Hutchins 1995), to connect current location and future destination – the third step of navigation – does not require a detailed plan. Construction work on locks or bridges, and occasionally bad weather can require an alternative route, of which there are not too many. Navigation as situated action' is about how to navigate the shallows, bends and currents of the river itself and passing other ships (and objects like bridges and locks). Across the width of the shipping lane passing arrangements can be agreed extemporaneously through marine VHF radio. If allowed, as is the case on Dutch waters, starboard-starboard passings are carried out too, making for a more diffuse traffic pattern.⁵ Apart from a sporadic dredger or anchored ship, everything is on the move, which is difficult to change: bringing a ship to a standstill can take several kilometres. This permanent movement and limited intervening capacity is a key spatio-temporal dimension of inland navigation. It requires actors constantly to anticipate the next ordering.

Other ships are accounted for through an assemblage which involves scanning the waterscape optically, listening in to the local marine VHF radio frequency, reading the overview that the AIS offers and the picture of surrounding objects that radar provides. AIS stands for Automatic Identification System and is a geo-locative system that through radio signals exchanges names, GPS locations, departure and destinations of a ship, which are then plotted on the nautical map. This exchange of positions is not frequent enough to navigate directly on this information, but it allows for a sense of traffic beyond sight, around a bend, which radar can't make visible, as the embankment blocks the radar signal. The dissemination of AIS was subsidised by the Dutch state before it was made mandatory. Skippers make themselves accountable by sharing their intentions and propose passing arrangements when outside control room territory amongst themselves through marine VHF radio.

To account for other ships is one thing, to steer clear of them is another. To move from the present ordering into the desired near-future navigational ordering, another assemblage is needed. The link between the two assemblages – accounting and steering clear – is made by the skipper (or helmsman). There can be more than one person in the wheelhouse, but for the length of a shift only one is responsible for linking them up. The steering assemblage unfolds through the interplay between the river, the shape of the hull, helm and rudder (connected hydraulically), the regulator of engines that power the propellers (most modern ships also have adjustable propellers upfront, called bow thruster), the cargo (and how it is distributed), the skipper and the feedback s/he receives

through CCTV cameras (detailing the separations in locks), sailors on deck (communicating over the internal radio frequency), the engine display (with fuel use as an important parameter). In these complex assemblages, it is easy to overlook the role of skippers' sensory faculty. When accounting for the environment and relevant objects and when steering clear of them, skippers are able to verify and complement information through an interplay of their senses and media (cf. Willkomm 2014, 2021). However, to steer clear of unaccounted objects is difficult, for instance when fog comes in to fill the waterscape, then reliance on mediated detection becomes near total.

On the river (contrary to a canal), there are no long straight stretches, no stable water volume, no even riverbeds. This means that navigation at its most elementary level has a short time perspective, in which the present circumstances are manipulated to achieve the desired near-future.

Episode two: conflicting temporalities of navigation – seen from the control room

The basic picture painted in the previous episode is complicated here by describing the role of control rooms in different orderings. It lays bare a fundamental temporal conflict of inland navigation between professional and leisure skippers. What becomes apparent is that the control room operators, when contributing to the accomplishment of regulatory orderings, are torn between market and navigational orderings.

To allow for safe and smooth passing at intersections and in ports, control rooms take up a coordinating role, as traffic is much more intense there. When everything is on the move, the place where this movement intersects becomes a 'choke point' (Carse et al. 2020). Their position is elevated, not unlike air traffic control towers, but more than direct sight an assemblage of (among others) CCTV cameras, cargo databases, radar networks, and AIS, bundled in two rows of horizontally linked screens provide a real time overview. Every section on the river has a designated marine VHF radio frequency, and within control room territory, the operator as a rule takes the initiative when intersecting courses have to be smoothed out into new orderings.

To grasp what is at stake in the second episode, the role of leisure skippering on Dutch waterways requires elaboration. As a rule, leisure skippers are not deeply integrated in navigational orderings, relying primarily on direct sight to account and be accounted for. In the field, the presence of leisure skippers was met with little enthusiasm by skippers and operators alike, though, for a senior policy adviser at Rijkswaterstaat, the infrastructure agency of the Dutch state, they had found their place through a market ordering: 'leisure skippering is a multi-billion Euro industry.' (interview 8-6-15)

Especially sailing yachts are often equipped with marine VHF radio, but skippers lack the training and skill to listen in on the relevant frequency consistently. To be accountable occasionally is to be unaccountable. Furthermore, many of them do not transmit an AIS signal and do not see those of others plotted on their digital nautical maps. This is where control rooms come in. Operators keep track of them and are often asked by professional skippers if they have had contact with a particular yacht and know their intentions.

On a clear summer day in 2018 Jan, a senior Dordrecht control room operator was called by a skipper of a yacht over the frequency shared by all traffic in that section. In a markedly upper-class accent, formulating full sentences instead of the concise VHF radio parlance (both signify he is from another world), the man explained he had run aground and had damaged his keel and rudder (field note 15-8-18). Before the patrol vessel of the control room had arrived, a professional skipper had pulled him clear. Over the radio the yacht indicated which port he would seek and thus how he would cross one of the busiest intersections of Western Europe, where traffic to and from the Rotterdam port, Antwerp port and Germany meet. When he subsequently did not sail accordingly, he was no longer replying to calls over the frequency. Jan was not surprised, he had – 'preventatively' – marked him in a contrasting colour in his interface, in which radar, nautical map and AIS are integrated into a view stretching several horizontally linked screens (ibid.). The moving objects that are detected by the radar network are animated so they have the appearance of a ship on Jan's screen, with a line extending from the hull to indicate in which direction the object sails. Only Jan

could see the marked yacht, he (a former skipper himself) had accounted for it on behalf of other professional skippers.

The regulatory orderings that operators seek to co-constitute are always tied between navigational and market orderings. The official motto of the state-run control rooms captures this: 'safe & swift'. Apart from when he got stuck, swift was no priority for the leisure skipper, and his subsequent behaviour showed he did not share the same understanding of safety as the professional waterway users and regulators.

To connect a present location to a future course depends on the accountability of others as much as giving an account. Where skippers act under ever-changing time constraints, leisure skippers have all the time in the world. Operators take up a mediation role, a third position, in their attempts to reconcile these different temporal regimes into navigational orderings.

IV. Just in time: navigating competition, speed and low water

The next three episodes are concerned with what is done to be just in time: skippers become competitors explicitly, taking more risk, with operators reaching the limits of what their assemblages enable them to. All these instances have to do with low water. For those ships chartered per voyage, low water makes for lucrative freights, as more ships are required for the same amount of cargo to be transported – demand outweighs supply. Thus, it gets busier on waterways and ships sail faster (also afforded by them being lighter) in order to pick up the next lucrative freight. To understand what is at stake in these episodes, rivers have to be understood as actors too.

Despite centuries of cultivation rivers are living. This is manifested not only in varying water levels, which, as discussed above, are kept a close eye on by skippers and authorities alike, but also in the current and the riverbed. Skippers know intimately how the current influences their course and speed, and where, closer to sea, it meets the tide. Through erosion and sedimentation, the current mobilizes and immobilizes constantly, which is apparent to those who navigate it regularly, always in search of deeper waters and cautious to avoid sandbanks. During low water, the riverbed can change quickly. This is enhanced by the fact that all ships use only the centre of the shipping lane, digging a new channel in the riverbed as their propellers come so close to it. People shape the landscape both by dwelling and through the paths they create, which renders a 'taskscape' visible, in which 'is sedimented the activity of an entire community, over many generations.' (Ingold 2000, 204) In riverscapes paths are created too, often over long periods of time, sometimes quite suddenly.

Episode one: closing time window – balancing draft, speed and riverbed

The first episode is about being (*just*) *in time* and took place in 2016 on board the *Liberty*, owned by Rob and Rebecca, who are both in their sixties. Their ship was built in 2002, just before the building frenzy of 2005–07, which led to an overcapacity after the 2008 crash, which was still being felt in 2016. This meant that their debt (several million euros) was close to the value of the ship. Rob said he wanted to sail until his last day, Rebecca would have liked to be closer to her children and grandchildren, but knew they had to keep on sailing for a while as their pension depended on it (field note 27–11-16).

On board of the *Liberty*, we passed a threshold in the river, a relatively shallow and rocky part of the German Middle Rhine:

Rebecca comes up to the wheelhouse because we scraped some rocks. When we hit a rock Rob immediately halts the engine. 'We have pulled it off again' Rob says to Rebecca and Leo, their sailor, after we passed the critical section. The water level is dropping. They are carrying a lucrative freight and would not have been able to make it half a day later. (field note 28-11-16)

The legally allowed maximum draft is the depth of the shipping lane minus a 30-centimetre margin. We had crossed that margin and had 10 to 20 centimetres left, Rob thought. Clearly, their market ordering was at odds with the ordering regulatory body's desire. Rob switched off the engines

because they would make the ship dig in the water, lying deeper. Rob's relief that they had made it 'again' indicates this happens more often.

The conundrum of the *Liberty* was that it had to run for the dropping water level while the speed required to do so made the ship come dangerously close to the riverbed. The faster a ship sails, the more water it displaces from under its hull, bringing itself closer to the riverbed. Dropping water levels cannot always be foreseen, even when freights are brokered on short notice, as often was the case for the *Liberty*. Once presented with the closing window of opportunity, Rob and Rebecca decided to dash for it. As a result, they put their navigational orderings (hull-riverbed) at risk in favour of their lucrative market ordering, discarding the official safety norm.

Episode two: losing time – the collective problem of acceleration

The second episode took place during the late summer of 2018 on board of the *Tigris*, which could not afford to get any closer to the riverbed and had to take it easy. Meanwhile, it was surrounded by ships who could not afford to *lose time*. When other ships speed up, competition increases and so do inequalities. Operators then intervene and become referees.

The *Tigris* pushed so little ore that the barges containing them lay shallower than the sizable push boat itself. The crew was uneasy with every faster ship overtaking them or passing them narrowly, taking away just that little bit of water they had left. Then, an operator from the Nijmegen control room, from where traffic on the Waal is coordinated (the main branch of the Rhine in the eastern half of the Netherlands), intervened when we encountered a smaller ship passing on our starboard. 'Give a little more space, for that is a pusher,' the operator said over the shared frequency (field note 13–10-18). Herewith, the operator demonstrated an understanding of our manoeuvrability and critical draft, preventing the encountering ship from taking away from under our hull the little water we had left. That the operator was capable of doing so, that he knew how to embody the relevant dimensions and foresee the critical variables at stake, almost certainly points to previous skippering experience. The grateful helmsman retold the story at the shift change.

This shows that if regulatory orderings are not actively built when skippers give market orderings preference, navigational orderings risk running into the ground. The rules themselves do not forbid passing with speed, sometimes that is even safer, just to get out of the way. Regulatory orderings allow for smaller margins in navigational orderings.

Episode three: stealing time – breaking agreements and consensus

In an escalation of the previous two episodes, here a skipper breaks with the consensually constructed navigational ordering to reposition himself favourably, which those involved considered unfair behaviour. He effectively *stole time* from other skippers.

This episode I observed in the Tiel control room, built at the intersection of the Waal and the Amsterdam-Rhine Canal. It took place earlier during the same 2018 low water period. The marine VHF frequency that day was filled with an unusual amount of swearing and heated exchanges among skippers. Ships coming out of the canal needed the control room, its elevated position overseeing the intersection and its radar network, to know when they could turn up the river, either up or down stream. All the approaching ships, many of them racing to their next freight, would listen in to hear what passing arrangement was proposed by the operator. Normally, operator Nicholas said, they would propose to give way by steering or reducing speed themselves, but during these busy days those skippers chartered per voyage could make up for an entire year of losses (field note 17-8-18). A former skipper himself, Nicholas acutely appreciated the situation. Then a barge turned up the river, though it had agreed to wait for the current batch of downstream traffic to pass. Several other skippers called in that this was not agreed, one had to go in full reverse to reduce speed, with the current pushing the ship forward. At that moment Nicholas could do nothing but confront the

deviating skipper over the radio, who feigned ignorance, so Nicholas thought. Had there been an accident, the tape of the radio conversation would have incriminated the rogue skipper.

This navigational ordering persisted despite one skipper breaking consensus. The norm of marine VHF radio communication in inland navigation is that passing arrangements are carried out as agreed verbally (and more fundamentally that agreement is sought in the first place). And yet cooperation still took place if we follow Goodwin's definition of 'co-operative action' (2013): action was enabled by and built upon the 'former operations of others' (Schüttpelz and Meyer 2018, 175–6). First the deviant skipper benefitted from the overview the operator relayed over the frequency and from the adherence to the passing arrangements by the other skippers, which made them predictable. Then the other skippers had to operate their ship in adjustment to the sudden move so that an ordering came about nonetheless.

The episodes presented in this section dealt with spatio-temporal scarcity. It is argued that the increased competition as a result of the scarcity makes the intensified interconnectedness of orderings visible. The decision to accept bodily risk might seem an individual one, but has collective ramifications. Operators try to salvage situations, but run into the limits of their agency as they rely on adherence to shared norms, and nudge rather than command ships into a desired ordering.

V. Resting time: navigating with assemblages of surveillance

This section consists of just one episode. It deals with the dark side of permanent accountability. The point is that being accountable all the time amounts to surveillance at the cost of resting time.

The episode was told as a story by William, the skipper and owner of the container ship the *Sunrise* (field note 30-3-17). It pertained to chartered per voyage sailing, which he no longer did. To understand the situation, some more information about AIS is required. The introduction of mandatory AIS for inland navigation – since 2012 in the port of Antwerpen, since 2014 on the entire Rhine, since 2016 on all Dutch waterways – was contentious. The Dutch state subsidised the installation of transponders, though not the investment in equipment, but privacy was the main concern of the skippers (interview 8-6-15). Now they could be tracked permanently, not only by state authorities, but by anyone. Services such as the popular MarineTraffic (website and app, Greek-owned) plot AIS signals on a map – one of the affordances is to track a selection of ships. Dutch skippers stipulated that the AIS information would not be made available to the general public and that it wouldn't be used for the enforcement of shipping law, such as mandatory resting time. The Dutch state conceded both points, but this does not prevent skippers from sending their data, and of the ships they detect, to services like MarineTraffic. As did Rob of the *Liberty*; he said that agents use this information to offer journeys, which might benefit him (field note 27-11-16). Relatives on land also use it to track where their loved ones are. On board skippers can make use of official AIS data plotted into their nautical maps. William of the *Sunrise* said

that he knows of skippers that have an illegal switch built in to shut down their AIS. This is not only about privacy, but also about competition. William: 'When several ships have to load at the same place, for instance from a sea ship, the person who arrives first gets his load first, the others have to wait several hours. You know or can guess that you are on your way there too (plus everyone knows each other). If you then go for a sleep (which for the sailing time law has a mandatory minimum length of 6 hours, everyone knows this) the other ship can try to just overtake you, and that could end up in winning a day. For those chartered per voyage this really matters.' (field note 29-3-17)

Here, to be accountable and to account for others, is where the regulatory and market ordering meet. If the skipper decides not to rest and continues to sail, the risk is not only bodily harm, but also a much heftier sanction compared to getting caught with a 'malfunctioning' AIS signal. For the latter, there is a 24-hour grace period in which repairs can be carried out, without central registration, so a skipper can always try to feign to be within those 24 hours. The international regulation of sailing time consists of the documentation of sailed time by skippers in a centrally issued red book and infrequent inspections by local authorities. In this book, the movement of the ship in time and the

activity of every crew member is registered.⁶ A skipper risks high fines for not adhering to the prescribed resting times; when caught in the act a ship can be forbidden to continue sailing, and forging the resting and sailing times in the booklet is a criminal offence.

Here different tracking regimes clash, one digital, one analogue. AIS is supposed to track movement, but captures stasis too, whereas in the resting time book, it is the skipper who tracks his own bodily stasis. The latter reflects whether the skipper managed to pause, made possible by handing over the helm to someone else, while the former in this case reflects whether the ship paused or not. In this story, the market ordering is explicitly visible – on a digital map the AIS shows all the competitors – and felt through surveillance. However, this assemblage depends on the detailed knowledge of skippers of the wider fleet, and how regulation translates into particular patterns of movement.

This empirical section could have been the last one. I could have said that all the elements that make up shipped mobilities on inland waterways are there, the interplay between movement and stasis are explained. However, it is the responsibility of the ethnographer to show how mobilities are lived, even if this further complicates the picture, which the next section will do.

VI. Asynchronous times: navigating shipping and family life

The main difficulty in intimate ordering is synchronising shipping and family life. Intimate orderings are far reaching. There are orderings established between crew members, guided by nautical hierarchies and traditions, which are intimate too. Here I want to focus on partner(s) and/or family who were not on board, as it is with these orderings skippers seemed most occupied. The distance has made those who are still on board increasingly reliant on media to still participate in those intimate orderings. The problem is that those on land often live in different rhythms. There are two ways to draw family near: 1) to stack the intimate ordering on top of others, which means searching small synchronous pockets of time in which mediated contact is possible, or 2) actively to make meeting loved ones happen by negotiating through media between orderings.

There are three episodes here: the first is an episode about finding pockets of synchronous time. In between I present an episode about relatively long stretches of solitary time, which were intimate before. The final episode is about negotiating between orders with the aim of sharing time and space with loved ones.

Episode one: pockets of synchronous time – stacking intimate orderings on others

At the very beginning of this article Jerry explained how it is hard to maintain a social life. Despite Silicon Valley's persistent efforts, he doesn't count mediated sociality as social. Work and social life – the latter understood here as intimate orderings – remain separate for him, though he does engage in various networked interactions with loved ones, of which some practices clearly precede the age of social media:

Jerry has his girlfriend on the line (...). She asks when he passes their house, he reckons around 1 or 2 o'clock, and says that is when William is steering. Connection is intermittent now, Jerry says he didn't get what she said. Routinely he says: 'Not sure if you can hear me but perhaps it is better if we try to call later tonight, one bleep is yes, two no.' (field note 29-3-17)

Jerry's girlfriend seems to be seeking a moment for them to be physically nearer, as their house is situated along the waterway the *Sunrise* will navigate later, but it becomes clear they live on different rhythms. William and Jerry alternated every twelve hours, sharing a meal at shift change – both are a week on board and then a week off. Furthermore, the almost realtime connection (notwithstanding the inevitable delay of transmission), is slipping away too. On every ship, I have witnessed instances of actors dealing with bad mobile phone coverage. Mobile phone networks are clearly designed for different geographies of movement.

On the water befriended skippers sailed past now and again. Then greetings were exchanged over the marine VHF radio frequency shared with all other skippers. On occasion, skippers agreed to switch to a separate frequency to chat as long as they were in radio range of each other. The pockets of time were never planned, but just happened spontaneously. In short, when stacking intimate orderings on top of navigational orderings, shared mediated time lasts as long as the connection holds.

Episode two: solitary time – media compete for attention

Especially during solitary night shifts intimate orderings are faraway. Retired skippers tell of how night shifts were once social events filled with conversations and a game of chess (interviews 5-1-18, 17-4-18). Now there is plenty of the wrong sort of time (from an intimate ordering perspective), time that has to be filled somehow. During the night shifts I was on board skippers were chatty, they seemed to enjoy having company for a change. Being alone in the wheelhouse is harder for women, as toilets are downstairs. In the limited time spent on board I was asked twice and agreed to take over the helm when a skipper had to go to the toilet and the husband was asleep, although I am utterly unqualified (for details see Boersma 2018, 122).

Otherwise media keep skippers company and are also used as instruments to stay awake. Only the *Tigris* did not have a television in the wheelhouse, it was also the only ship where night shifts were not done alone. The media – ranging from traditional scheduled television broadcasts, to algorithmically propelled on-demand viewing platforms, or games on mobile phones – used to fill solitary time compete for attention with the navigational audiovisual input. Every burst of marine VHF radio chatter that fills the wheelhouse can be of vital importance. A television or a smartphone is only one of many screens and gauges to keep an eye on, through which other critical orderings need to come about.

In the depopulated wheelhouse risk is no longer shared among a crew. Nowadays, when there is an abundance of time on ships, there is often no one to share it with.

Episode three: sharing time and space – active negotiation between orderings

The final theme is the effort made to *share time and space*: ordering oneself with loved ones actually to meet, either on land or on board. Both Maria and Philip of the *Porter* and Rebecca and Rob of the *Liberty* had a few weeks holiday a year while another crew took over, all planned well in advance. The time was used to live in their house or apartment, to see family, to travel. Both could not afford to moor the ship for such a long period.

Smaller family events proved much harder to align with other orderings, most prominently market ones, as the following episode illustrates. Rob was called by an agent who offered a journey, and he answered his smartphone while at the helm. He was hoping not to sail next Sunday as it was the annual family day with their children and grandchildren – going to the zoo and then for dinner in Rotterdam. This meant they wanted to berth the ship where they could lift their car off the ship and be within a few hours driving distance of the city.

Rob tells the agent about his family plans next Sunday. After he hangs up he mentions the price of 16.000 euros, and tries to figure out if the water levels allow for the weight of the cargo, so this is about the predicted water levels. Another agent calls. Rob receives a new offer, also steel coils, 17.000 euros, leaving from Antwerpen, which means he has to go there empty first. Doesn't appeal to him. He asks if there is nothing for the Lower Rhine. (field note 28-11-16)

Sailing empty meant covering his own fuel costs. For Rob to contemplate prices was to evaluate distance in time and future space on the river in terms of draft. The challenge is to align navigational orderings geographically with the intended intimate ordering, so as to switch: the intimate ordering can't happen simultaneously, other orders have to be paused. This requires negotiation, as Rob does with the agents.

On the *Porter* and the *Liberty* they never know where their next journey will bring them. This made them knowledgeable of many local infrastructures, also because they had to direct their children near enough to their ships, that is, when they were old enough to travel on their own between boarding school and wherever the ship was moored. Before that, children were picked up by car from their boarding school for the weekend, regardless of where the ship was moored. From the 1980s onwards skippers found ways to load and unload a car, mainly used for this purpose, although it was also convenient for doing groceries. Automobility augments and compensates nautical mobility. There were times when Rebecca of the *Liberty* would drive alone from southern Germany for five-hundred plus kilometres to the Dutch boarding school on a Friday, drive back to Germany to bring her kids on board, returning them on Sunday afternoon, to drive back alone to Germany again (field note 30-11-16). This way she single-handedly amassed two-thousand kilometres in three days.⁷ This illustrates that to align intimate orderings with market orderings implied taking bodily risks.

The synchronisation of the different rhythms of those on board and those on land is difficult. When skippers are already engaged in other orderings and stack their intimate orderings on top of them, they are at the mercy of mobile phone coverage to convert available time in shared, yet mediated time. When there is no one to share time, not only because of physical isolation, but also because of diverging rhythms, media keep skippers company. When intimate orderings are not residual but preferred over other orderings, when only the intimate ordering should be ongoing and the others put on hold, skippers manoeuvre to come to a market ordering that allows for an interval.

VII. Conclusion

This article has mapped out how ships on Western European inland waterways go from mooring to motion and back. Through sociomaterial assemblages four different orderings have been set out: navigational, regulatory, market, and intimate. In this way ordering is an ongoing situated practice, distributed through time and space. The challenge, however, is for actors to reconcile the different rhythms across the water-land spectrum.

As a rule, practices can be studied ethnographically when zooming in, following actors wherever they go. However, when action is distributed, ethnographies should be too. It is shown that by following the action, different sites can be connected. As a result, ethnographies can be scaled up cohesively, without uncoupling itself from situated practices.

This approach helped to undermine the land-water dichotomy that has kept mobilities studies largely tied to land in at least three ways: control room work that necessarily has to happen from land, the ever-changing riverbed as a muddy taskscape, and loved ones who live in different rhythms on land.

First, it has brought to light the efforts of inland navigation control rooms in achieving safe and smooth navigational orderings. Their mobilizing ability rests on an overview that comes with being immobilized themselves. This is true in two ways: 1) most operators were skippers before and actively use their knowledge and skills to deal with the demands that come with (re)positioning oneself in the different orderings while on the move, and 2) can only utilize this experience when giving up the restricted view of the wheelhouse and embrace the removed, but not detached, view that the control room assemblage affords.

Second, the riverbed is jointly shaped by currents, ships and dredgers, and gives shape to how water flows and ships navigate in return. The less water the river holds, or the wider the river is, the closer the riverbed and the propellers of the ship come. Once they are too close, the ship will dig itself in, with likely calamitous consequences. Authorities try to secure this critical distance not only by deepening the river, but also by accounting for its state in the first place and restricting the maximum draft. Yet skippers do not always align with regulatory orderings and instead stretch margins, but ultimately muddle through.

Third, intimate orderings tie shipping crews to land, either through stacking this ordering on top of others, or by negotiating a carefully timed mooring. The former means sharing mediated presence whenever the situation arises, which is easier to endure for hired crews who disembark after a week

or two of sailing. The latter is the challenge for those who own the ship and carry the financial weight of not only immobilizing themselves, but also the ship.

Four types of orderings have been theorised, which enable and benefit each other, but can also be at odds with each other. However, most often market orderings tend to prevail. When regulatory orderings allow for smaller margins in navigational orderings it is ultimately to the benefit of market orderings. Spatio-temporal scarcity on the river results in risky navigational orderings, spurred on by the profitable market orderings. Climate change will likely exacerbate this. Although low water is not uncommon, the 2018 low water period on the Rhine described above was unlike any skippers – some of them sailing professionally for four decades – had ever experienced.⁸ With more dry extremes ahead and less routine to fall back on, problems mount, as this article demonstrated that less space on the river actually leads to more traffic. Until of course there is too little water left.

Finally, finding a place in these orderings results in three main temporal challenges. Ships struggle to be just in time, made into a collective problem by the (lack of) water, though not always perceived by all skippers that way. Skippers are pressured to keep on sailing through assemblages of surveillance while in need of taking resting time. And, third and last, conflicting rhythms make it hard to synchronise time (and space) with those on land.

This study demonstrates that the empirical method needs to take account better of the distributed nature of complex interactions of actors by following their action. Analysis shows that these situated practices can themselves be theorised into four distinct, but interrelated orderings. This gives us an invaluable perspective on a hitherto under analysed nexus of competing and conflicting priorities in shipped mobilities. Furthermore, the analysis sheds light on how human and non-human actors involved in essential work interact, when time is of fundamental significance. Ultimately, the way in which navigation on these waterways is accomplished by actors from both water and land brings into stark relief the central role of media both by keeping separate what would otherwise collide and drawing near what would otherwise remain distant to a fundamentally important infrastructure.

Notes

1. Upon their request, all names of crew members and ships have been altered. All quotes were written down verbatim in Dutch while in the field and translated into English by the author.
2. The Netherlands is the most important European trade partner of Germany (Ramakers 2012), most of these goods only pass through the Netherlands (Hueck and Went 2016; CBS 2018). At the turn of the 21st century about half of these were transported through inland navigation (Filarski 2014, 357). While the Dutch state markets itself as 'one of the world's leading trading nations' (Holland 2018), 'the logistics hub of Europe' (Koehler 2018, 57) with its 'largest port' (61), inland navigation never seems to receive much recognition.
3. Nine control rooms were studied ethnographically for at least one 8-hour shift and the subsequent shift change. Of these control rooms, three Dutch ones – between Rotterdam and Duisburg – were visited for multiple shifts over the course of three years. A whole range of Rijkswaterstaat employees were interviewed, five of them operators, some retired, who went back to being a skipper again (cf. Boersma 2018).
4. All ships were joined for journeys ranging from 2 to 5 days. Subsequently, through emails and SMS contact was maintained, and later supplementary interviews were conducted by phone.
5. On Western European waterways ships keep port side (left) like cars do on the road.
6. The minimum number of hours of consecutive rest is six per 24 hours and over the course of a week half the time, 84 hours has to be resting time. As there are no tachographs on board the skipper can document whatever the rules demand and act differently. This is a very delicate topic that none of the skippers felt confident discussing.
7. Both Rebecca (*Liberty*) and Maria (*Porter*) spoke about leaving their children for the first time at boarding school, once they were of age. It was also about the bodily experience, the affective nature of that experience as a mother. Tellingly, only the women I met felt compelled to account for this decision, and I reproduced this gendered ordering as I did not raise this topic with men that much either. The week after I left the *Liberty* I texted Rebecca to ask how their family day was. She replied: 'We had lots of fun with our children and grandchildren Sunday. It was a bit cold in the zoo, lots of animals were inside or were hibernating. Afterwards we went for dinner in an Afghan restaurant ... which was really nice.' (Field note 30-11-16).
8. In fact, it is highly unlikely that the extreme heat and drought of the 2018 Northwest European summer would have occurred without climate change (cf. Otto 2017; Schiermeier 2018; WWA 2018; Vogel et al. 2019).

Acknowledgments

Many thanks to the skippers who took me on board and were such generous hosts. Thanks to the operators who not only endured my presence, but also invited me to their desk and guided me through scores of interfaces and processes. This paper benefitted considerably from the reviewers' feedback and conversations with Silvan Pollozek, Henry Allen, and Koen Leurs. Any remaining mistakes are entirely my own.

Disclosure statement

No potential conflict of interest was reported by the author.

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