boattr 360 - cultural heritage of the canals

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Abstract

This paper discusses the towpath/'network' of the British Waterways as a digital social commons, through the researcher's journey on the narrow boat Quintessence and the development of the boattr prototype in collaboration with fellow boaters (bargees), the MAZI (for "together" in Greek) project, a Horizon2020 research project, and the 7067 – It's not a Test radio performance. For three years the researcher (Dr. Adnan Hadzi) together with his partner, the documentary photographer Natascha Sturny, joined the community of bargees. The paper uses as a basis the boat logs created over the MAZIzone, in a diary format, to address the urban commons topic in a broader more poetic approach analysing three projects, namely the boattr prototype, MAZIzone, and 7067 – It's not a Test, divided into the three years, of which each is dedicated to one of the projects. Alongside the edited diary texts a selection of images taken during those three years illustrates this paper. In the boattr 360 installation audiences can interact with the MAZIzone viewing image galleries and 360 videos of the boat journey.

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This paper discusses the towpath/"network" of the British Waterways as a digital social commons [1], [2], through the researcher's journey on the narrow boat Quintessence and the development of the boattr prototype in collaboration with fellow boaters (bargees), the MAZI (for "together" in Greek) project, a Horizon2020 research project, and the 7067 – It's not a Test radio performance. For three years the researcher (Dr. Adnan Hadzi) together with his partner, the documentary photographer Natascha Sturny, joined the community of bargees [3], [4] known as "bargee travellers" [5], [6], who use the canals as a place to live [7], [8], but with only a temporary permit [9] to stay for two weeks in one place [10]. The paper will also offer a critical view on the housing situation [11], [12] in the UK and EU in general.

The boattr project connects narrow boats to the "Internet-of-Things" [13] and allows for open wireless networking within the narrow boat community, by using affordable microcomputers [14]. The paper analyses this technology, which aims to empower boaters who are in physical proximity to each other, sharing data, media and know-how while strengthening local awareness of the canals. The paper reflects on do-it-yourself networks and open wireless networks [15], [16] set up by the researcher offering a local communication network to the bargee community.

Besides this paper the project was also manifested as a boattr 360 installation, alongside a running boattr prototype (as a computer book), where audiences are able to experience boattr through a VR headset [17]–[21], and access the boattr prototype and computer book over any WiFi enabled device.

The installation encompassed a photographic triptych (by Natascha Sturny) showcasing canal life, seating representing a narrow boat's bow on which the viewer can sit and become immersed in a journey on the narrow boat Quintessence. The boattr 360 installation makes use of video as theory [22]. In accordance with the qualitatively new situation video is set in, the installation presents a virtual reality environment, documenting and illustrating the researcher's journey on Quintessence.

The boattr DIY prototype [23] offers local services to the narrow boat community, off-network, not connected to the Internet. The research project was about the materiality of the network itself, taking ownership and control of the whole design process, promoting independent grass-roots innovation, rather than fear of data shadows [24]. The project allowed for easy and inclusive access through the use of a local captive portal launched automatically when one joins the network, with the option for anonymous interactions. Participants in physical proximity connected over the boattr prototype did not have to disclose private information to third parties.

The paper uses as a basis the boat logs created through the boattr research project, in a diary format, to address the urban commons topic through a broader more poetic approach documenting the three projects, namely the boattr prototype, MAZIzone, and 7067 – It's not a Test, divided into the three years 2015 until 2017, of which each is dedicated to one of the projects. Alongside the edited diary texts, a selection of images taken during those three years illustrates this paper.

2015: Running the boattr prototype on Quintessence

The first boattr prototype was developed at the London Hackerspace [25], [26] by Antonios Galanopoulous, who installed boattr back in 2014 on his own narrow boat Blue Morn. The boattr prototype [27] was a hardware/software research project into the management of off-grid, autonomous sites. It collected and processed data from environmental sensors and provided remote monitoring, control and automation. Optionally it could also provide a host of other peripheral services that could run on small embedded computers (wireless access point, internet connectivity, virtual private network remote access, TOR gateway, file storage, etc.).

At Harefield Marina, near Uxbridge, we bought a traditional narrow boat, named Quintessence. On a fine day we went to pick up the boat, the sun was out and there wasn't much wind either. The first thing we did was shopping for the off-grid life, as we were soon to live without being connected to electricity, water, plumbing, phone, etc. Most importantly for the boattr project were solar panels, all the electrics, and an electricity generator. Our Vetus engine was in very good shape.

Since boaters living off-grid [28] have tended to lack good information about the energy consumption and production, battery health and the various other subsystems of the boats, one part of the research project was about being able to better understand how those systems work by collecting, analysing and visualising their data. The other aspect was the use of real-time information from the sensors as well as historical data to make clever decisions and respond to external changes. The boattr prototype had current, voltage, temperature, air/water quality, humidity and water pressure sensors. Data was collected from the sensors and stored in a database every minute. We could create real time graphs as well as mine the database for other historical data.

We installed the boattr microcomputer on Quintessence, using a beaglebone [29], [30] microcomputer, a 4G phone [31], all connected over a USB hub [32], and WiFi access point. Now there were two boattr microcomputers on the UK Waterways (Blue Morn and Quintessence). With boattr we used a Dallas 1-wire [33] microlan for a network of temperature, electricity, environmental sensors [34]. The heart of the system was a beaglebone black ARM [35] embedded computer running Debian OS.

The software part of boattr was made of a Ruby module [36] with two classes, Sensors and Data and the puppet [37] provisioning code. The Sensors class contained all the functionality to obtain the results from the the various different sensors connected to the system [38]. Data was responsible for processing resulting data, saving and sending to other places. The boattr prototype in this context was the Ruby program which ran every minute collecting data from sensors, analysing and sending to the database and dashboard among other things.

After some fiddling with dashing [39] there was a dashboard that we found useful, offering four temperatures, battery voltage, 4G data allowance remaining, solar panel production and amp hours information for the last 24 hours. It became obvious that, during the winter months, we did not make enough energy from the sun. We had to run the generator once a day to make up for the lack of sun.

We decided to leave our flat on 21 February 2015, a week prior to the official deadline, which was a wise decision: the flat above was vacated early too and the landlord started with renovations straight away. So, it was official: we had become bargees [40]. The first week was a difficult one, physically and emotionally. The boat was moored up on Broadway Market [41] and we were able to carry all our stuff from our flat to the boat. Anton lent us his trailer, which made it a bit easier. Natascha was in an unstable mood and was afraid of what is going to come. The unknown, the lack of space, lack of amenities. Leaving the flat after ten years was hard, she had her routines and old habits die hard. Though in this instance those habits, like doing the washing when you want, had to die immediately. From now on we relied on launderettes. Putting on the central heating when it was cold? Gone. Instead we had a coal powered Morso [42] stove. Thankfully boattr also gave us temperature readings when out and about, so we could see when coal had to be topped up.

The fact that we had to move the boat every 14 days [43], [44] didn't make the situation easier. Our license was referred to as Continuous Cruiser and meant that we were only allowed to moor up on a spot for up to 14 days. We were not allowed to return for the period of one year.

2 April 2015: A rather big storm hit London and Sava our cat disappeared. We put up numerous flyers around the area. We managed to extend our stay for two more weeks. We talked to fellow boaters and each night went out with cat food. We shared pictures and info about our cat over our boattr box, which fellow boaters could access over the open wireless access point. Nothing.

A bizarre thing happened. One morning a black cat jumped onto the bed, but it wasn't Sava! We somehow thought we knew this cat. By sharing images of the cat over our boattr box we found out who his owner was, a fellow boater, a girl who used to squat the building next door on our old street. The cat was living in that squat too and came around once or twice to the flat there. Well, nice to see you again, Mr Twist, the cat.

Meeting those people again was an interesting coincidence; we came to understand that many former squatters moved onto barges due to the fact that squatting of residential properties had been made illegal, in fact a criminal offence, since 1 September 2012 [45]. Of course many of them couldn't afford the rent in London and moving onto a barge was the only option. And some of those boats were really in a dilapidated condition, simply because the people also didn't have the cash flow to get a swanky boat. It became apparent that not just us but many others moved onto boats because London has become unaffordable to live in[46], while many residential properties are left empty for years.

9 June 2015: We got a phone call from a woman who lives in Kings Cross – she and her son believed that Sava was hiding in their garden. With the cat carrier in tow Natascha headed towards central London, found the house and yes, there she was. After two months Sava was back! And immediately sticking her head into the corner where the boiler was. Curiosity kills the cat. In the meantime the roof top garden was producing salad. The boattr sensors allowed us to monitor the humidity and temperature of the soil [47].

End of June: We cruised out of London, into nature. The initial journey from Broxbourne up to Harlow Town was, to put it simply, sublime. It was boaters' paradise, and now the bargee life started to make sense. The boattr sensors recorded good weather conditions for weeks. River Stort is a natural river, no concrete slabs lining it or anything the like. Even though the water is considered "grey water", meaning the shower & washing up water from boats goes into the river, River Stort's water is very clean (relatively). The water quality measured by boattr in Regent's Canal (by Broadway Market) was much worse than that in the River Stort.

Just one remark regarding grey water: we've been very strict and use only biodegradable washing up, cleaning and hygiene products. This unfortunately is not always the case with fellow boaters. We've seen many Fairy Ultra's on window sills; who knows what else is put down the drain. You can see straight away when the "Fairy Ultra" boaters do their washing up – it bubbles much longer than the biodegradable one. Frankly, it's a mystery why the Canal and River Trust [48] doesn't hand out guidelines in that regard and encourage boaters to use biodegradable products.

Autumn 2015: The summer came to an end, and it turned out that our boattr project was quite self sufficient during the sunny summer days. We did not have to run the generator and the boattr solar panels produced enough energy for two people living on a boat using their laptops on a daily basis. After months out in the countryside we were looking forward to being back again and mingling with fellow boaters and to be close to friends over winter. But but but… it was bloody difficult to find a suitable spot to moor. And this in Tottenham?! There were so many boats doubled up already. We did find a place in the end, but it became clear to us that for the next six months or so space would be scarce – nothing like being on your own in nature.

It's a fact that there are more and more people moving onto boats in and around London, for a simple but sad reason: renting has become too expensive [49]. What do you do, if you lived all your life or a major part of your life in London, have work here, a social network (as in "real" people) – you don't want to move to some place where it's affordable to rent and leave all behind?! So, the next step is you get yourself a boat. And some boaters really are poor, so they end up with "yoghurt pots", plastic boats. It's cold but at least there is a shell around the body and you are not homeless.

We belonged to the more affluent boaters, we could buy coal, diesel and we could bring Quintessence to the mechanic if something went wrong, etc. With the boattr project we could even monitor and control our usage. Fellow boaters simply can't do that and if the engine breaks down, or worse there's no money for diesel, they can't move. Then you have the friendly guys from the CRT enforcement [50] team who regularly come with their shiny computerized toys to check our license to see if we had done the

moving bit too. And beware if you overstayed for a day or two, an email will land in your inbox with the request to move on, or else… well, if you get a reminder once or twice or more, the CRT will issue only a temporary license for the next renewal. The temporary license is more expensive. Boaters are obliged to move regularly [6], otherwise the license will be revoked and if you don't get your boat out of the water yourself, they will do it for you. It is clear to us, the problem the CRT is faced with is that the housing crisis is being partially rolled over to them. The waterways are quite old and some of them in dire need of restoration [51].

The joys of London cruising are unlimited and when you end up in a place like Three Mills [52], you either love it or hate it. There is nothing in-between. I loved it, Natascha hated it. There you go, a proper relationship dilemma. It's a hyper industrialised location where the visitor moorings are, and on the other side of the canal is the Blackwall Tunnel Approach, meaning: cars, cars, cars – the air pollution [53] is, as measured by our boattr sensors [54], quite literally, breathtaking.

2016: keeping a boat log with the MAZIzone

MAZI is to provide technology and knowledge in order to empower those who are in physical proximity, to shape their hybrid urban space, together, according to the specificities of the respective local environment generate location-based collective awareness as a basis for fostering social cohesion, conviviality, participation in decision-making processes, self-organization, knowledge sharing, and sustainable living facilitate interdisciplinary interactions around the design of hybrid space and the role of ICTs in society. [55]

We made our first circle through and around London with Quintessence, and arrived back at Broadway Market [56], our old neighbourhood. Now it definitely felt like home! Just shy of one year on the boat and we were back … but but but, mooring up along the canal stretch of Andrews Road was a totally different case than walking along it. The tow path for a bargee was also a lawn or a porch or something the like. But here it felt more like a dog toilet. Frankly, it was unpleasant to stay there and regularly stand in a pile of shit.

The rubbish created along the trendy areas in London was astounding and Broadway Market was one of them. Bargees were regularly reminded that their life is a precarious one; rubbish bins were removed [57] so that we didn't know where to dispose of the rubbish that we created.

This was a part of Regent's Canal where you could only stay for seven days, though we weren't too sad when those days were up. We went up Acton Lock opposite the newly created Talavera Mooring [58], a prime CRT property. Bargee hyper-commercialization at its worst. A bidding system was introduced for that mooring, eleven berths went to the highest bidders. Some went for over £1000 / month. It seems that the house price madness affects the fixed moorings in this area too, or is it just an opportunistic venture?

Spring 2016: On the way to Angel, we had to stop at the water point near City Road. Panayotis Antoniadis [59]–[61] from MAZI [62]–[64] was having a stroll along the tow path, visiting Quintessence. I discussed with Panayotis how to integrate the MAZI research into the boattr project, installing the MAZIzone on Quintessence. MAZI is a Horizon2020 research project, in which Deckspace medialab is a partner. I had been researching with Deckspace for many years on the Deptford.TV project [65], [66],

and now I was looking forward to integrating the MAZIzone [62] into the boattr prototype. MAZI is a DIY networking toolkit [67], [68] allowing for the collection and sharing of data [69] over cheap microcomputers. We immediately started using the MAZIzone as our boat log. Basically a webserver running the WordPress blogging platform, accessible locally with our phones, tablets and computers. This paper constitutes an edit of all the log entries, in a diary form. The MAZIzone allowed us to share data, over the Nextcloud [70] application, with fellow bargees, as they could also access the MAZIzone over the WiFi SSID 'boattr'. Furthermore through Nextcloud we created our audio/visual documentation in the form of a database.

We installed the MAZIzone on the roof of Quintessence. So far we had been running the MAZIzone from our living room (inside a Lego box). Now it goes out of the Lego box into a weather proof casing. "The design for intimate communication, yet without commitments, between those in physical proximity, and collective action by building the community network. The empowerment of citizens to claim their right to the hybrid city, including access, participation, representation, and ownership. The availability of complementary infrastructures in case of disasters that offer resiliency." [55] The MAZIzone [71] for boattr consists of a Raspberry Pi [72], hosting a webserver and a database, offering wireless access, and a captive portal guiding the users through the applications and tools available on the boattr MAZIzone [73].

Somehow the bargee community isn't much respected by society, rather being vilified at times. When we arrived in London back in 2002, the Regents Canal was a no-go area at night, way too dangerous. It got safer with the arrival of the boater community, we believe, though the odd disturbed mind was still around and making people's lives a problem, for sure. For us, the bargee way of life should be regarded as an enrichment for society. Is there anywhere in Europe another such community of "water gypsies" [74]? We don't think so. Hence, why not cherish, support and even protect it?

Thus it was a privilege to moor up next to "The Village Butty" [75] the community boat for bargees and non-bargees alike. Step into the magic world of bargees, where game nights, concerts and "how-to toilet composting" events take place. All very necessary, insightful and great fun. On special days you even get oysters – what a treat (for those who like 'em). Here we ran our first MAZIzone workshop showcasing our boat log, explaining to fellow boaters how to use do-it-yourself networking [76], and sharing valuable documents and know-how for the boating community.

MAZI wishes to invest in an alternative technology, what we call Do-It-Yourself networking, a combination of wireless technology, low-cost hardware, and free/libre/open source software (FLOSS) applications, for building local networks, mostly known today as community wireless networks. By making this technology better understood, easily deployed, and configured based on a rich set of customization options and interdisciplinary knowledge, compiled as a toolkit, MAZI will empower citizens to build their own local networks for facilitating hybrid, virtual and physical, interactions, in ways that are respectful to their rights to privacy, freedom of expression and self-determination. [55]

During the MAZI workshop we explained the MAZI portal, how we created our boat log, and how one could access the MAZI guest book on the boattr box. The MAZI portal offers a user interface giving access to the different applications available.

Furthermore workshop participants setting up their own MAZIzone could configure their own network name [77], SSID and look into the usage statistics of their MAZIzones. Over the guest book [78] we were sharing boaters' know-how documents, such as legal advise for bargees, off-grid living tips and tricks, but also photos and films. The original guest book was developed by Lutzer [79] for the Hybrid LetterBox project [80].

Summer 2016: Uxbridge is a funny place, it turned out to be a Brexiteers heaven, of course. Could it be because it is the constituency of Boris Johnson [81], the chieftain of the Leave campaign? [82] The referendum was ahead of us and most of London seemed against Brexit. Not in Uxbridge though, which isn't central London, but is still Greater London. 23 June 2016 belongs to the past and the Brexit vote result is out. Britain voted for it [83]. The morning of the 23 June was a bleak one, waking up has seldom felt so distorted. The seemingly impossible had become real. Driving up to Uxbridge felt like a betrayal. What on earth has crossed their minds? The Empire [84] is long gone, it will not be resurrected, ever, and the UK can't sail on it's own in the murky waters of global economy and politics, and we were sailing to the Midlands: Brexit Heartland.

Natascha wanted to leave 5 minutes after we arrived in the Midlands, at Swan Lane Wharf, in Coventry. It's a fact – she didn't like at all where we ended up. Feeling anxious already when cruising on Coventry Canal, she claims she hasn't seen that many rats jumping into the canal before, the water way became increasingly dirty, the surrounding area desolate. Was this our new home?

Coventry's "resurrection" after WW2 was badly handled [85, pp. 1941–1950], and is indeed famous for that. Just how bad it was only became clear when we did that trip "down to the basin" [86]. For crying out loud, who in his or her right mind had the idea to built a ring road around the centre? And the first City Centre Ikea was opened here in 2007. Yes, Ikea has a massive presence in the centre, in the instantly recognisable shape of a large blue cube.

Autumn 2016: We decided to move to the Midlands's countryside around Stratford upon Avon, to a basin named Kingswood. The first day on our way to Kingswood Basin we spent some nine hours cruising. That was already challenging for us, and the cat. Although it was September, the thermometer climbed up and it was rather warm for the time of the year. We found a tremendous spot to moor up for the night, the cat went out straight away and we caught the last sun rays. It was a beautiful moment.

Day two of the journey turned out the be a back breaking nightmare. There were many locks to work, 27 in total in one day! It was apocalyptic to cruise through Birmingham from the side we did, we came from the Birmingham & Fazeley Canal section and we had to pass under Spaghetti Junction. Heavily industrialized landscape for miles on end and then this junction. We had to turn left into the Grand Union and shortly afterwards there was a CRT mooring which neither of us approved of for an overnight stay, fools that we were. We cruised through Birmingham [87] at night, the canal not looking good at all, cranky old locks to work. And we continued cruising – it was getting later and later, but we finally had Birmingham Centre behind us. Generally it was really dark along the canal and we could hardly see a thing, apart from a massive incinerator at one point. We didn't have a clue where we were.

The next morning we did the last lock, filled up the water tank and moored at Kingswood Basin. It was a glorious moment. No more enforcement team, no more clogged Elsan disposal, decent water pressure. And great neighbours. Heaven.

December 2016: Reflections at the end of the year - Autumn in the Warwickshire countryside [88] was stunning. It's considered an old landscape, meaning people have been occupying this part the the UK for centuries [89]. Some of the hedgerows are kind of elevated layers and layers of roots. And stories, we guess. There are many old oak trees, really stunning ones and we keep wondering during our walks, what have they witnessed?

The winter arrived with golden light, frozen canal and mushrooms still growing.

2017: Digital Arts on Quintessence: 7067 – It's not a Test

"7067 khz - it`s not a test" calls for daily transmission of automatically/manually generated radio signals from different stations around the world at scheduled time slots. Recalling the Sputnik satellite's outer space broadcast of radio pulses in the fifties, Eleonore's 7067khz inverts the space signals to Earth signals, calling for like-minded media/cultural spaces to sign on for signal sending. In honor of the first radio artists who were using the signals as a material for art, the 7067khz stands for independent information and communication bypassing the use of the internet. We do not want to specify the content of the transmission, rather we consider the act of sending the signals an act of solidarity in this post-internet future present. [90]

Spring 2017: Back to nature. It was wet of course but the weather didn't hinder us from going out for walks, our wellies making it possible to walk the wet land. As always, nature as a means of therapy. Of course the spring sun came back out, the moss is reaching up to catch the rays. March is here. The weather was picture perfect and we decided to go cruising again. After months of staying put, it was time to move Quintessence. We wanted to make the most of it since there was a change appearing on the horizon. The canal water was full of algae and with the boater season starting, the turbines were acting as some kind of mixer, the water turned bright green – lovely. On the 1st of June we launched the "7076 – It's not a Test" art project [91] on Quintessence. Franz Xaver, the initiator of the 7076 – It's not a Test project, explains that we "call for artists to send in the signals in SSTV (slowscan TV) and CW (continuous wave) automatically or manually. With ham radio equipment and monitors at the exhibition space, the visitors can follow the signals sent from different stations with low-res pictures and amplified sound output. We are broadcasting signals on the Frequency of 7067 khz. Like the signal of Sputnik – it is not important what you are broadcasting its important that you are broadcasting. Like the Signal of Sputnik 1957 the broadcast itself is the political message." [90].

Due to issues with the antenna we only managed to get two connects, over WSPRnet [92], on 16/6 and 17/6:

1) 2017-06-17 17:26 QA5IQC 7.040128 -26 0 JO92 0.5 G4KRW IO92fv 1378 280
2) 2017-06-16 18:10 QA5IQC 7.040124 -27 -1 JO92 0.5 G3JKV IO91uf 1325 272

We had to fix this. The PI [93]should have send on the antenna. The problem might have been the radio noise. We might have wanted to look into getting a Band Pass Filter kit. The

antenna seemed to be the most difficult bit. Funnily enough our boat neighbour was also experimenting with radio, but on the APRS – Automatic Packet Reporting System [94].

Information technology is increasingly becoming a power factor in a globally networked world. Algorithms control the global information networks. We secure information about autonomous networks and offer the possibility of independent information transmission. We do not want to stand in competition with the global information players of the capital. That's why we reduce the bandwidth of our information transfers to a few hertz. Independence has the price of information reduction and reduction does not mean total loss of control. [90]

Unfortunately we never managed to fix the antenna as circumstances changed and we were about to sell Quintessence in the summer of 2016. On the 29th June we said good bye to Kingswood Basin and the people there. The sky was grey and so was the water. It wasn't easy, as the last few days with Quintessence were upon us. We started early and headed towards Hatton Locks [95], as a first hurdle we had to pass 21 wide locks -- good we were going down! We had a boat ahead of us, meaning we could team up with them. It's easier to work those locks together, which we did and off we went, down the first lock.

Just after Calcutt Locks [96], which were the last locks we worked, we reached Napton Junction [97] where we had to turn into Oxford Canal [98] in the direction of Braunston [99]. It was an emotional journey not least also because the sun came out and it was glorious cruising weather. The cruise was easy, no more locks and a prime canal section. We ended our boater life on a high note.

boattr: British Waterways as safe havens – a future outlook

Having operated boattr, MAZIzone and the 7061- this is not a test art project over the past three years, I will give a possible future outlook of envisaged developments of this research project. One of the missing features of the MAZIzone for the boater community was a second radio on board of the Raspberry Pi. Now with the latest version of the Raspberry Pi this missing link is being offered on the board of the microcomputer. With two antennas it is now possible to use one as an access point and the other to network the box into a mesh network, allowing for boats passing by to sync up with each other.

This would allow for the boater community on the British Waterways to become a safe haven [100], [101] for bargees, turning the canal network into a public library [102], possibly also offering access to shadow libraries such as the memory of the world [103], aaaarg [104], Sci-Hub [105]–[107], libgen [108], [109], and similar libraries. Those shadow libraries could be hosted on a boattr mesh network. Currently Marcell Mars [110] is working on a second edition of the 'public library' book [111] together with Lawrence Liang [112]. According to Mars: "We're seeking contributions that reflect on the library as strategic and tactical ground, politically, economically, epistemologically. That engage with it from its ideation, material and institutional aspects, both historic and present. Coming at it from the angle of media theory, literary theory, political history, political economy, experimental writing. When discussing initially, our co-editor Lawrence Liang said that our first Public Library book was on the (public) library as a fighting concept, while this one should be about the (public) library as a dancing or laughing concept. So, this volume delves also into the imaginary and what Lawrence called carnal librarian-ship, but we wish to avoid either going into typical Borgesian imaginary of radical potentiality or into trying to imagine overhasty nostrums of what public libraries need to turn themselves into to legitimate their economic existence." [113]

On the 26th of June 2018 the centre for post digital studies at Coventry University organised a workshop on this very topic, entitled Radical Open Access II – The Ethics of Care [114]. Care with regard to:

- our means of creating, publishing and communicating research;
- our working conditions;
- our relations with others.

Indeed, for many members of the ROAC, a commitment to ethics entails understanding publishing very much as a complex, multi-agential, relational practice, and thus recognising that we have a responsibility to all those involved in the publishing process. Caring for the relationships involved throughout this process is essential, from rewarding or otherwise acknowledging people fairly for their labour, wherever possible, to redirecting our volunteer efforts away from commercial profit-driven entities in favour of supporting more progressive not-for-profit forms of publishing. But it also includes taking care of the nonhuman: not just the published object itself, but all those animals, plants and minerals that help to make up the scholarly communication ecosystem. [115]

It would be interesting to extend the concept of radical open access to the British Waterways, opening up the the urban commons [116] as a discursive space around topics such as the environment [117], climate change [118], extinction of species [119], [120], and the anthropocene [121]. The boattr project could become a self-organised platform cooperative [122].

References

[1]   N. Streitz, 'Citizen Centered Design for Humane and Sociable Hybrid Cities', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[2]   S. Iaconesi, 'Data and the City: Moving from surveillance and control to the Ubiquitous Commons', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[3]   NBTA, 'National Bargee Travellers Association – Representing the interests of all itinerant live-aboard boat dwellers', *National Bargee Travellers Association*, 2018. .

[4]   E. Mulcahy, S. Baars, K. Bowen-Viner, and L. Menzies, 'The underrepresentation of Gypsy, Roma and Traveller pupils in higher education A report on barriers from early years to secondary and beyond', King's College, London, 2017.

[5]   LB, 'Welcome to London Boaters', *London Boaters*, 17-Jul-2012. [Online]. Available: http://www.londonboaters.org/about. [Accessed: 03-Dec-2018].

[6]   B. O. L. Bowles, 'Gongoozled: Freedom, Surveillance and the Public/Private Divide on the Waterways of South East England', *Etnofoor*, vol. 29, no. 1, pp. 63–79, 2017.

[7] Lilo, 'Welcome to LILO - Low Impact Life Onboard', *Low Impact Life Onboard*, 2018. [Online]. Available: http://www.lilo.org.uk/. [Accessed: 03-Dec-2018].

[8] M. Kaaristo, 'Mundane tourism mobilities on a watery leisurescape: canal boating in North West England', doctoral, Manchester Metropolitan University, 2018.

[9] D. Fletcher, 'Residential Boat Owners' Association', *RBOA*, 2018. .

[10] NBTA, 'The Business of Gentrification', 2018. .

[11] K. J. Fuller, 'Planning for Emergence: An informal Intervention on the Okanagan Lake', Thesis, 2010.

[12] P. Gogarty, *The Water Road: A Narrowboat Odyssey Through England*. Pavilion Books, 2013.

[13] F. Wortmann and K. Flüchter, 'Internet of things', *Bus. Inf. Syst. Eng.*, vol. 57, no. 3, pp. 221–224, 2015.

[14] N. Mitsuishi and S. Ikari, *Microcomputer*. Google Patents, 2018.

[15] C. Fuchs, 'Sustainability and community networks', *Telemat. Inform.*, vol. 34, no. 2, pp. 628–639, May 2017.

[16] T. Hardes, F. Dressler, and C. Sommer, 'Simulating a city-scale community network: From models to first improvements for Freifunk', in *2017 International Conference on Networked Systems (NetSys)*, 2017, pp. 1–7.

[17] Google, 'Google Cardboard', *Google VR*, 2018. [Online]. Available: https://vr.google.com/cardboard/. [Accessed: 03-Dec-2018].

[18] SpherePlay, 'VR Player', *VimerSiv Inc*, 2016. [Online]. Available: http://www.vrplayer.com/. [Accessed: 03-Dec-2018].

[19] Zeiss, 'VR ONE Cinema', *Apple App Store*, 2014. [Online]. Available: https://itunes.apple.com/cn/app/vr-one-cinema/id945065060?mt=8. [Accessed: 03-Dec-2018].

[20] Fuller M., 'Mobile VR Station', *Apple App Store*, 2018. [Online]. Available: https://itunes.apple.com/cn/app/mobile-vr-station/id959820493?mt=8. [Accessed: 03-Dec-2018].

[21] Homido, 'Homido 360 VR player', *Apple App Store*, 2018. [Online]. Available: https://itunes.apple.com/cn/app/homido-360-vr-player/id909196467?mt=8. [Accessed: 03-Dec-2018].

[22] A. Treske, *Video Theory: Online Video Aesthetics or the Afterlife of Video*. Bielefeld: transcript Verlag, 2015.

[23] D. Dragona, 'From Community Networks to Off-the-cloud toolkits: Art and DIY networking', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[24] S. Rogerson, 'The Data Shadow', *SIGCAS Comput Soc*, vol. 47, no. 1, pp. 8–11, May 2017.

[25] S. Rashof, 'Designing place : topologies of "maker labs"', Ph.D., Goldsmiths, University of London, 2016.

[26] J. J. Bowden, 'Who makes a makerspace? Makerspace governance in Toronto, Ontario, and London, Ontario', *PhD Diss McGill Univ.*, no. McGill University, 2016.

[27] A. Galanopoulos, *boattr*. London: GitHub, 2015.

[28] A. Hope, T. Roberts, and I. Walker, 'Consumer engagement in low-carbon home energy in the United Kingdom: Implications for future energy system decentralization', *Energy Res. Soc. Sci.*, vol. 44, pp. 362–370, Oct. 2018.

[29] A. McPherson and V. Zappi, 'An Environment for Submillisecond-Latency Audio and Sensor Processing on BeagleBone Black', presented at the Audio Engineering Society Convention 138, 2015.

[30] D. Norris, *The Internet of Things: Do-It-Yourself at Home Projects for Arduino, Raspberry Pi, and BeagleBone Black*. McGraw-Hill Education, 2015.

[31] R. Ratasuk, A. Prasad, Z. Li, A. Ghosh, and M. A. Uusitalo, 'Recent advancements in M2M communications in 4G networks and evolution towards 5G', in *2015 18th International Conference on Intelligence in Next Generation Networks*, 2015, pp. 52–57.

[32] S. Saito, 'USB hub and control method of USB hub', US9342131B2, 17-May-2016.

[33] R. O. Gosheblagh and K. Mohammadi, 'Designing and implementing a reliable thermal monitoring system based on the 1-wire protocol on FPGA for a LEO satellite', *Turk. J. Electr. Eng. Comput. Sci.*, vol. 23, no. 1, pp. 171–186, Jan. 2015.

[34] M. Ibrahim, A. Elgamri, S. Babiker, and A. Mohamed, 'Internet of things based smart environmental monitoring using the Raspberry-Pi computer', in *2015 Fifth International Conference on Digital Information Processing and Communications (ICDIPC)*, 2015, pp. 159–164.

[35] A. Nayyar and V. Puri, 'A Review of Beaglebone Smart Board's-A Linux/Android Powered Low Cost Development Platform Based on ARM Technology', in *2015 9th International Conference on Future Generation Communication and Networking (FGCN)*, 2015, pp. 55–63.

[36] L. Carlson and L. Richardson, *Ruby Cookbook: Recipes for Object-Oriented Scripting*. O'Reilly Media, Inc., 2015.

[37] T. Uphill, *Mastering Puppet*. London: Packt Publishing Ltd, 2016.

[38] K. Kloeckel, 'Technology mediation and visualizing urban energy data', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[39] G. M. D'silva, A. Khan, Gaurav, and S. Bari, 'Real-time processing of IoT events with historic data using Apache Kafka and Apache Spark with dashing framework', in *2017 2nd IEEE International Conference on Recent Trends in Electronics, Information Communication Technology (RTEICT)*, 2017, pp. 1804–1809.

[40] B. Bowles, 'Water ways: becoming an itinerant boat-dweller on the canals and rivers of of South East England', Thesis, Brunel University London, 2015.

[41] T. Conder, *Canals in Britain*. London: Bloomsbury Publishing, 2017.

[42] Morsø, 'Morsø 1412 with squirrel sides', 2018. [Online]. Available:

https://morsoe.com/en/product/indoor/multifuel/p1412_squirrel. [Accessed: 10-Dec-2018].

[43] UK Government, 'British Waterways Act 1995', 1995. [Online]. Available: http://www.legislation.gov.uk/ukla/1995/1/section/17/enacted. [Accessed: 10-Dec-2018].

[44] M. Stephens, 'Judicial review of mooring guidance to go ahead', *Kennet and Avon Boating Community*, 2012. .

[45] L. Finchett-Maddock, 'Squatting in London', in *The City Is Ours: Squatting and Autonomous Movements in Europe from the 1970s to the Present*, B. van der Steen, Ed. PM Press, 2014.

[46] P. Bernstock, *Olympic housing: A critical review of London 2012's legacy*. London: Routledge, 2016.

[47] J. Fox, 'Raspberry Pi Soil Moisture Sensor', *Instructables.com*, 2015. [Online]. Available: https://www.instructables.com/id/Soil-Moisture-Sensor-1/. [Accessed: 10-Dec-2018].

[48] CRT, 'Water levels, flood risk, discharges and water quality', 2015. .

[49] C. Hamnett, 'Moving the poor out of central London? The implications of the coalition government 2010 cuts to Housing Benefits', *Environ. Plan. A*, vol. 42, no. 12, pp. 2809–2819, 2010.

[50] B. Bowles, '"Time Is Like a Soup": Boat Time and the Temporal Experience of London's Liveaboard Boaters', *Camb. J. Anthropol.*, vol. 34, no. 1, pp. 100–112, Mar. 2016.

[51] N. Slawson, 'Troubled waterways: canals take the strain of London's housing crisis', *The Guardian*, 04-May-2015.

[52] P. Barkshire, 'Tide Mill (Known as the House Mill)', *Historic England*, 2018. [Online]. Available: https://historicengland.org.uk/listing/the-list/list-entry/1080970. [Accessed: 10-Dec-2018].

[53] J. Hoffman, 'particleBox: Visualizing Particulate Matter. Air Quality Sensors, Democratizing Data and Public Health', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[54] H. Lynn, 'Sensly: an air quality monitoring HAT', *Raspberry Pi*, 23-Sep-2015. .

[55] P. Antoniadis, 'MAZI', *P2P Foundation*, 2016. [Online]. Available: https://wiki.p2pfoundation.net/MAZI. [Accessed: 10-Dec-2018].

[56] P. Hubbard, 'Hipsters on our high streets: Consuming the gentrification frontier', *Sociol. Res. Online*, vol. 21, no. 3, pp. 1–6, 2016.

[57] CRT, 'Bins and recycling', *Canal & River Trust*, 2018. [Online]. Available: https://canalrivertrust.org.uk/specialist-teams/maintaining-our-waterways/maintaining-our-facilities/bins-and-recycling. [Accessed: 10-Dec-2018].

[58] S. Atty, 'Talavera Moorings', *CanalplanAC - Canal Route Planner*, 2016. [Online]. Available: //canalplan.eu/place/5t91. [Accessed: 10-Dec-2018].

[59] P. Antoniadis, I. Apostol, M. Gaved, M. Smyth, and A. Unteidig, 'DIY networking as a facilitator for interdisciplinary research on the hybrid city', in *Proceedings of Hybrid City 2015: Data to the People*, Athens, Greece, 2015, pp. 65–72.

[60] P. Antoniadis, 'Local networks for local interactions: Four reasons why and a way forward', *First Monday*, vol. 21, no. 12, Nov. 2016.

[61] P. Antoniadis, 'NetHood', *NetHood*, 2018. [Online]. Available: http://nethood.org/panayotis/. [Accessed: 04-Dec-2018].

[62] NITlab, 'Overview | Mazi Project', *MAZIzone.eu*, 2018. [Online]. Available: http://www.mazizone.eu/about/overview/. [Accessed: 04-Dec-2018].

[63] NITlab, *MAZI Handbook*. Thessali, Greece: University of Thessali, 2018.

[64] P. Antoniadis, 'A DIY networking toolkit for location - based collective awareness', University of Thessaly, Thessali, Greece, 2018.

[65] A. Hadzi, *Deptford. TV diaries*. London: London: OpenMute, 2006.

[66] A. Hadzi, 'What is Deptford. TV?', in *Deptford. TV diaries.*, London: OWN, SPC Media Lab & Deckspace, 2006, pp. 7–9.

[67] P. Antoniadis, 'The Organic Internet: Building Communications Networks from the Grassroots', in *Co-Designing Economies in Transition: Radical Approaches in Dialogue with Contemplative Social Sciences*, V. M. B. Giorgino and Z. Walsh, Eds. Cham: Springer International Publishing, 2018, pp. 235–272.

[68] Constant, 'networks of ones own', *Constant VZW*, 2018. [Online]. Available: https://networksofonesown.constantvzw.org/. [Accessed: 11-Dec-2018].

[69] M. Smyth and I. Helgason, 'Life at the Local Scale: An alternative perspective on the urban', presented at the Conference: Hybrid Cities - Data to the People, Proceedings of the 3rd International Biennial Conf Athens, Athens, 2015.

[70] F. Karlitschek, 'NextCloud', *Nextcloud*, 2018. [Online]. Available: http://nextcloud.com. [Accessed: 11-Dec-2018].

[71] P. Antoniadis, *MAZI-project guides*. London: MAZI project, 2016.

[72] E. Upton, 'Raspberry Pi — Teach, Learn, and Make with Raspberry Pi', *Raspberry Pi*, 2012. [Online]. Available: https://www.raspberrypi.org.

[73] P. Antoniadis, 'Digital rights as human rights: The important role of Free, Libre, and Open Source Software', presented at the Human Rights and ICT − Why and how are they related?, ISOC Switzerland Chapter, 10-Aug-2018.

[74] P. Maynard, 'London's houseboat boom: "the community is the boaters around you"', *The Guardian*, London, 11-Nov-2014.

[75] A. Cade, 'The Village Butty', *The Village Butty*, 2015. [Online]. Available:

http://www.villagebutty.com/p/home.html. [Accessed: 11-Dec-2018].

[76] I. MacArthur, 'Empowering Citizens and their Input on Civic Issues through Urban Media', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[77] Z. Blas, 'Contra-Internet', *E-Flux*, vol. Journal #74, Jun. 2016.

[78] Lutzer, *MAZI Guestbook application*. London: MAZI project, 2016.

[79] Lutzer, 'Hybrid Letter Box', *GitHub*, 2016. [Online]. Available: https://github.com/lutzer. [Accessed: 11-Dec-2018].

[80] J. Gesche, 'Hybrid Letter Box', *Design Research Lab*, 2016. [Online]. Available: http://www.design-research-lab.org/projects/hybrid-letter-box/. [Accessed: 11-Dec-2018].

[81] B. Worthy, 'Boris Johnson's influence over the outcome of the EU referendum is highly overstated', *Democratic Audit UK*, 24-Feb-2016. [Online]. Available: http://www.democraticaudit.com. [Accessed: 11-Dec-2018].

[82] S. B. Hobolt, 'The Brexit vote: a divided nation, a divided continent', *J. Eur. Public Policy*, vol. 23, no. 9, pp. 1259–1277, 2016.

[83] M. J. Goodwin and O. Heath, 'The 2016 Referendum, Brexit and the Left Behind: An Aggregate-level Analysis of the Result', *Polit. Q.*, vol. 87, no. 3, pp. 323–332, Jul. 2016.

[84] J. Gallagher, *The decline, revival and fall of the British Empire: the Ford lectures and other essays*. Cambridge: Cambridge University Press, 2004.

[85] J. Hasegawa, *Replanning the Blitzed City Centre: A Comparative Study of Bristol, Coventry, and Southampton, 1941-1950*. London: Open University Press, 1992.

[86] N. Crowe, *Book of Canals*. London: BT Batsford Limited, 1994.

[87] A. Sargent, 'More than the sum of its parts: Cultural policy and planning in Birmingham', *Int. J. Cult. Policy*, vol. 2, no. 2, pp. 303–325, 1996.

[88] S. Rippon, *Historic landscape analysis: deciphering the countryside*. York: Council for British Archaeology, York, 2004.

[89] G. E. Mingay, *The rural idyll*. London: Routledge, 2017.

[90] F. Xaver, *7067 KHZ – it's not a test / 7067 KHZ*. 2016.

[91] A. Soulitou, 'ICTs and Contemporary Art: a platform for the urban well-being', in *Hybrid City III | Data to the People*, Athens, Greece: University Research Institute of Applied Communication (URIAC), University of Athens, 2015.

[92] J. Taylor, 'Welcome to the Weak Signal Propagation Reporter Network', *WSPRnet*, 2015. [Online]. Available: http://wsprnet.org/drupal/. [Accessed: 11-Dec-2018].

[93] J. Peroulas, *Raspberry Pi WSPR transmitter using NTP based frequency calibration*. London: GitHub, 2013.

[94] B. Bruninga, 'APRS: Automatic Packet Reporting System', *APRS*, 2015. [Online]. Available: http://www.aprs.org/. [Accessed: 11-Dec-2018].

[95] CRT, 'Hatton Locks', *Canal & River Trust*, 2016. [Online]. Available: https://canalrivertrust.org.uk/places-to-visit/hatton-locks. [Accessed: 11-Dec-2018].

[96] S. Atty, 'Calcutt Locks — information', *CanalPlanAC*, 2016. [Online]. Available: https://canalplan.eu/feature/131. [Accessed: 11-Dec-2018].

[97] S. Atty, 'Napton Junction — Gazetteer', *CanalplanAC - Canal Route Planner*, 2016. [Online]. Available: //canalplan.eu/place/k58u. [Accessed: 11-Dec-2018].

[98] S. Atty, 'Waterway Gazetteer for Oxford Canal', *CanalPlanAC*, 2016. [Online]. Available: https://canalplan.eu/waterway/humh. [Accessed: 11-Dec-2018].

[99] S. Atty, 'Braunston Turn — Gazetteer', *CanalplanAC - Canal Route Planner*, 2016. [Online]. Available: https://canalplan.eu/place/9ctj. [Accessed: 11-Dec-2018].

[100] P. Jandric, 'Knowledge Commons and Activist Pedagogies: From Idealist Positions to Collective Actions', in *Learning in the Age of Digital Reason*, London: Springer, 2017, pp. 243–269.

[101] K. Easterling, *Extrastatecraft: The power of infrastructure space*. London: Verso Books, 2014.

[102] P. Jandrić, *Learning in the age of digital reason*. London: Springer, 2017.

[103] M. Mars, 'Memory of the World', *Memory of the World*, 2016. [Online]. Available: https://www.memoryoftheworld.org/. [Accessed: 11-Dec-2018].

[104] S. Dockray, 'Aaaaarg.org', *Memory of the World*, 28-Oct-2014. .

[105] J. Bohannon, 'The frustrated science student behind Sci-Hub', *Science*, vol. 352, no. 6285, pp. 511–511, Apr. 2016.

[106] J. Bohannon, 'Who's downloading pirated papers? Everyone', *Science*, vol. 352, no. 6285, pp. 508–512, Apr. 2016.

[107] M. McNutt, 'My love-hate of Sci-Hub', *Science*, vol. 352, no. 6285, pp. 497–497, Apr. 2016.

[108] G. Cabanac, 'Bibliogifts in LibGen? A study of a text-sharing platform driven by biblioleaks and crowdsourcing', *J. Assoc. Inf. Sci. Technol.*, vol. 67, no. 4, pp. 874–884, Apr. 2016.

[109] Q. Schiermeier, 'Pirate research-paper sites play hide-and-seek with publishers', *Nature*, vol. 528, 2015.

[110] Monoskop, 'Marcell Mars', *Monoskop*, 2014. [Online]. Available: https://monoskop.org/Marcell_Mars. [Accessed: 11-Dec-2018].

[111] M. Mars, 'Public library (an essay)', *Memory of the World*, 27-Oct-2014. .

[112] J. Karaganis, Ed., *Shadow Libraries*. Massachusetts: The MIT Press, 2018.

[113] M. Mars, 'coventry in june/july', 17-May-2017.

[114] J. Adema, 'Radical Open Access', *Disruptive Media*, 2018. .

[115] G. Hall, 'Radical Open Access II – The Ethics of Care', *Centre for Post-Digital Cultures*, 2018. [Online]. Available: /research/research-directories/research-events/2018/radical-open-access-ii-the-ethics-of-care/. [Accessed: 11-Dec-2018].

[116] B. Bodó, 'Libraries in the post-scarcity era', in *Copyrighting Creativity*, London: Routledge, 2016, pp. 85–102.

[117] Ö. Yaka, 'Rethinking Justice: Struggles For Environmental Commons and the Notion of Socio-Ecological Justice', *Antipode*, vol. 0, no. 0, 2018.

[118] D. Chakrabarty, 'The politics of climate change is more than the politics of capitalism', *Esprit*, vol. January-February, no. 1, pp. 153–168, Jan. 2018.

[119] E. H. Boakes, N. J. B. Isaac, R. A. Fuller, G. M. Mace, and P. J. K. McGowan, 'Examining the relationship between local extinction risk and position in range', *Conserv. Biol.*, vol. 32, no. 1, pp. 229–239, Feb. 2018.

[120] G. G. Thompson, L. A. Maguire, and T. J. Regan, 'Evaluation of Two Approaches to Defining Extinction Risk under the U.S. Endangered Species Act', *Risk Anal.*, vol. 38, no. 5, pp. 1009–1035, May 2018.

[121] J. Robinson, 'Living With Loss In the Anthropocene', University of Washington, Washington, 2018.

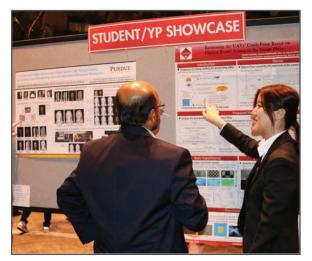[122] T. Scholz, 'Platform Cooperativism vs. the Sharing Economy', *Trebor Scholz*, 05-Dec-2014
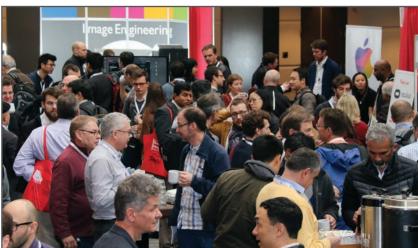
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