The Possible Worlds of VR Documentary

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Many commentators have argued that the climate emergency is a crisis of culture and imagination as much as it is one of policy and economic transformation. 'In order to leave the age of fossil fuel behind, swiftly and decisively' Rebecca Solnit suggests, 'we need stories that encourage and envision change.' (Solnit 2023 n. pag.) We also need cultural experiences that challenge what Solnit calls 'habits of mind' – the philosophical frameworks that have underpinned the age of fossil fuel. This chapter is interested in the contribution that documentary might make to this pressing work, as it harnesses the affordances of Virtual Reality (VR). It considers case studies of VR projects that engage the temporal imagination and that reflect human entanglement with some of the other life forms that we share this planet with. I'll consider how these immersive projects develop and diverge from documentary traditions and suggest ways that they challenge human exceptionalism and historicise the present, and in doing so reflect and seek to produce new subjectivities.

Computerised media technology expands the media sensorium introducing new ways of seeing and new forms of sensory engagement that now intersect with documentary content within VR experiences. I will explore the ways documentary makers are harnessing the opportunities represented by spatial storytelling, post-lenticular visualities and multisensory registers. Among other things, these emerging practices introduce forms of embodied experience and proprioception into nonfiction storytelling. Case studies of VR and its close relation Mixed Reality demonstrate a variety of such sensory potentials that are still novel for documentary, and I will theorise these embodied experiences, drawing on phenomenological film criticism to frame the forms of knowledge that emerge when documentary engages senses beyond the visual and aural modalities of 20th century documentary.

There is significant scepticism towards VR within Documentary Studies. There are multiple reasons for this, some of which relate to what I've discussed elsewhere as the 'hype and

hope' (Rose 2018) that has surrounded the platform. Concerns arise from VR's rootedness in Silicon Valley and centrality to Meta's strategy, around questions of the platform's accessibility, and in relation to the environmental impact of the proliferation of media technologies. People reject the headset as an isolating proposition, and as a potent symbol of digital disconnection. However, British film historian, Ian Christie, has recently argued that critical appraisal of immersive experiences is also being inhibited by a long-standing cultural current, a 'consistent hostility of arbiters of aesthetic taste to the creation of spatial illusion - except perhaps in stage design or when practised by noted artists.' At a moment when, in Christie's estimation, 'we are living through a media revolution, which may prove no less dramatic than that of the 1890s, when moving pictures first reached screens around the world', we need to consider how VR is being used and what it might offer nonfiction.[i]

Producers have been drawn to VR for its potential to render vivid experiences of nonfiction content. The politics of its affective operation, particularly in relation to distant human others, has been analysed and critiqued. This chapter explores what is at play when this affective potential is deployed within mediated encounters with non-human species and speculative worlds. In these projects, I suggest, it's possible to see the affective power of VR harnessed, not simply to provoke feeling, instead to trouble dominant 'structures of feeling' (Williams 1977: 132) and support the emergence of new formations of consciousness.

Cinematic VR and the More-than-Human World

Where the experience of watching a movie or examining a painting has been compared to looking through the Renaissance scholar Alberti's window, the experience of VR has been compared to falling through that window so that one feels as if one is situated within the frame (Bolter and Grusin 1999:162). Cinema viewing is based on a well-known optical illusion – still images which are interpreted as movement by the viewer due to the persistence of the optical image on the retina. VR involves its own illusion. When the computer displays a panoramic 3D image which changes in a life-like way as the participant turns her head – her visual experience produces the feeling that she is in the place she sees, even though her bodily sensation – proprioception - tells her that she is in situ where she

put the headset on. This psychological effect that is known as presence is regarded as the characteristic sensory experience of VR (Steuer 1992:80).

The documentary value of immersion and presence were promoted by early adopters of VR for nonfiction storytelling – notably by producer Chris Milk in a much-debated 2015 TED talk, 'How virtual reality can create the ultimate empathy machine'. VR, Milk argued, 'feels like the truth – you feel present in the world you are inside and present with the people you are inside it with' (Milk 2015). While Milk's claim for an intrinsic link between VR and empathy has been contested, as I'll discuss, his promotion of VR as a platform for nonfiction proved compelling. Immersion and presence can together be seen as driving the decisive take up of VR that I've discussed elsewhere as an 'immersive turn' within nonfiction (Rose 2018), as they intersect with a long-standing documentary interest – expressed notably within the Direct Cinema movement – in 'the feeling of being there' – the very title of that movement's pioneer Ricky Leacock's memoir (Leacock 2012).

The themes of early VR nonfiction reflected in the *Mediography of VR Nonfiction*[ii] (Bevan *et al* 2019) show how producers looked to the nascent platform to provide a feeling of presence in relation to people and places remote from the Global North. The mediography shows that this trend had its corollary in relation to the natural world, with a flurry of projects whose rationale was to harness the experiential potential of 360^0 video to offer close encounters with creatures 'in the wild'. *700 Sharks* (Gourdet and Lefevre 2018) is promoted as a virtual dive, with an invitation to "Experience a thrilling adventure on the atoll of Fakarava"…" with Laurence Ballista, marine biologist and underwater photographer, 30 men, 700 sharks, *and you*…." [my italics]. *In the Presence of Animals* (Fletcher 2016) shares an environmental agenda with a number of early VR works, with 360^0 video employed to bring the viewer into virtual proximity with a bison, a grizzly bear, a pygmy sloth, frigate birds, in order to raise awareness of how all of these animals' habitats have been encroached on by human activity.

As well as highlighting human impacts on animals in their native environments, several early VR nonfiction works advocate for animal rights. *iAnimal* (Valle 2016-2017), a three-part series produced by the international animal advocacy group Animal Equality, stands out

among these projects for its profile, reach and impact. In the UK alone, according to the project website, it was featured on the BBC, in the Daily Mirror, and toured by Animal Equality to seventeen universities with more than 5,000 students watching the VR film, and more than half of them pledging to reduce animal products in their diet or eliminate them entirely (Animal Equality website 2017: n.pag). As the majority of the VR works emerging during the first years after the Oculus Rift was launched were based on 360^0 video capture, *iAnimal* provides a useful case study through which to consider how this form, also known as Cinematic VR, offers continuities with and differences from linear video.

The *iAnimal* series centres on three titles - *Through the Eyes of a Pig* (Valle 2016), *The Dairy Industry in 360 Degrees* (Valle 2017) and *42 Days* (Valle 2017). Formatted in multiple languages, these were made available through the Oculus store, can be seen as 360^0 videos on You Tube, and were toured in an outreach campaign to university campuses internationally. The first work, *Through the Eyes of a Pig* (Valle 2016*),* shot undercover across seven countries, reflects the conditions and treatment of pigs that are born and die in the industrial system. The English language version of the work is introduced by musician Tony Kanal. The ten-minute experience then positions the viewer as virtual witness to the life cycle of a factory-farmed pig: the sow hemmed into a narrow crate, in which she is unable to stand or turn; piglets squealing while humans casually dock their tails and clip their teeth; finally, fully conscious pigs having their throats cut, writhing before falling lifeless. Recorded at pig's eye level, the 360^0 perspective is harnessed to provoke a form of mimesis of the pig's experience, the frameless but enclosed media space giving the viewer a powerful sense of immersion in the factory farm, able to look around, but not to escape the bleak setting and the brutal unfolding process. A video of viewer reactions produced by Animal Equality (Valle 2016, n.pag) shows people powerfully affected by the VR experience, interpreting it as compelling evidence of a cruel system that needs dismantling.

Kate Nash has discussed how the feeling of virtual proximity offered by VR brings a risk of 'improper distance' (Nash 2017: 2), which is problematic for the critical role of documentary witness, because it can collapse the viewer's awareness of their remoteness from, and privilege in relation to, the subject and circumstances portrayed. *Through the Eyes of a Pig* plays deliberately with this tension. It harnesses presence to confront the viewer with the

conditions of the factory farm and employs anthropomorphism to reinforce identification with the animals portrayed. In the voice-over, Kanal speaks, as if to the animal on-screen, '…you're behind bars, you don't know what you are in for, but looking around you see countless others like you…if you happen to be born a girl, you'll…be robbed of your children over and over again…for as long as you remain fertile' (iAnimal 2016). Anthropomorphic identification makes this painful to witness, but viewers know that they are not at risk from the treatment portrayed. Instead, they are implicated in the Anthropocentric system under scrutiny, so an awareness of privilege and distance are maintained.

The *iAnimal* series provoked some controversy when it debuted at Sundance. While some praised the effectiveness of the work and said it had convinced them to give up factory-farmed meat, others questioned the ethics of causing such distress to viewers. Participants in audience research that we undertook within the VR Documentary Encounters project (Green et al 2021) found immersion in nonfiction themes compelling and thought that the 360^0 view and the feeling of presence deepened their understanding of the content, but they also flagged their concern about the potential psychological impact of immersion in troubling real-world subject matter. Some highlighted the potential misuse of VR immersion for persuasion or propaganda. [iii] Philosopher Tomas Metzinger echoes these concerns, warning that the potential for VR to be misused is likely to accelerate as it develops and is subject to what he has dubbed 'technological confluence' (Metzinger 2018: n.pag.), being combined with other technologies such as AI and photorealistic avatars. The ethical use of VR therefore calls for careful thought on the part of producers, as well as for the development of editorial advice and guidelines.

While 'the feeling of being there' engendered by 360^0 video plays a significant role in the impact of *iAnimal* on the viewer, in other respects the series displays continuities with forms of meaning making that have characterised documentary in the twentieth century. The ethos of the series – its authority – draws on a number of factors. The undercover footage gathered internationally provides evidence of the ubiquitousness of these agricultural practices and lends the project epistemic weight by linking it to the evidentiary performances of investigative journalism. While the series lacks the editorial validation of being produced by a recognised news or TV brand, Kanal and the other celebrity advocates,

selected for their familiarity with the target audience, mediate between the production team and the viewer, eliciting the viewer's trust through their endorsement of the project. The argument of the series – its logos – rests on what we might see as the foundational practice of documentary, the shaping and sharing of moving images that have an indexical relationship with the physical world, as visible evidence of matters of shared concern. 360^0 video expands that evidence beyond 2D video, giving the viewer the impression of being within the system under scrutiny and the freedom to scrutinise the whole-scene, in a way that feels unmediated, but it doesn't fundamentally alter the nature of the relationship between viewer and image.

William Uricchio has stressed that VR is an imprecise term, encompassing divergent technologies, interfaces and experiences which we need to 'disambiguate' in order to develop 'new expressive vocabularies and techniques'. (Uricchio 2016: n.pag.). Uricchio characterises 360^0 video as essentially a video panorama - the content fixed in duration and arrangement - its moniker, Cinematic VR, underscoring its shared ontology with film. The *iAnimal* series demonstrates this continuity. By contrast, as I will show, VR works based on forms of digital image capture can have the openness characteristic of computerisation. These can be rendered algorithmically to respond in real-time to the shifting gaze within the headset, but also to other movements – standing, walking, reaching out - in what's known as Six Degrees of Freedom (6DoF). To reflect these divergent ontologies, I refer to the participant in Cinematic VR as a *viewer*. Drawing on the terminology of VR pioneer Char Davies I call the person experiencing a 6DoF VR work an *immersant* (Davies 2004: n.pag).

What potential might the lens-less visualities and embodied experiences of 6DoF VR have for documentary? How might these support the pressing cultural work of challenging dominant modes of understanding and being? In the next section I'll explore these questions through case studies of projects that expand the sensory repertoire of twentieth century documentary and that engage the immersant with what David Abram has called 'more-than-human worlds' and with the 'earthly web of relations' (Abram 2017: 8) which he sees humans as embedded within.

Post-lenticular Visualities and Embodied Experiences

Between 2015 and 2020 the UK agency Marshmallow Laser Feast (MLF) developed three VR nonfiction projects exploring how forms of digital imaging and interaction – novel to documentary - might provide fresh encounters with the more-than-human. The first work in MLF's informal trilogy, *In the Eyes of the Animal* (2015) arose from a residency in the Grizedale Forest in England's Lake District, within a commission by the Abandon Normal Devices Festival. Marshmallow Laser Feast's Robin McNicholas explained how the team sought to, 'explore the sensory perspectives of the animals that lived there….by taking sonic samples for the soundtrack, and a 360 Lidar scan, and digital sample of the environment too' (McNicholas 2015)

Lidar – an acronym for light imaging, detection and ranging – is a form of lens-less image capture technology developed in the 1960s that uses lasers to judge distance and depth. Combining lidar with photogrammetry, and informed by what's known about animal sight, MLF developed expressive visuals suggesting how three species – dragonfly, owl, and frog - might see the forest. Within the VR headset, the participant is invited to choose one of the three animal perspectives and finds herself immersed in an entrancing visual world, seeing as if through the eyes of one of these woodland creatures. Meanwhile, she experiences bodily sensation, through a Subpack a device worn as a backpack which converts audio inputs into tactile outputs so that in the dragonfly section of the work she experiences a buzzing sensation, in the frog section, a deep throbbing. *In the Eyes of the Animal* was my first introduction to the incorporation of lidar within a documentary experience, and its unfamiliar visual renderings and 360^0 view produced a compelling impression of the visuality of another species. Lidar joins a generation of technologies of image capture - time-lapse, super slow motion, high-res, high frame rate, drones, GoPros - that have been harnessed for nonfiction in the twenty-first century, being used notably within natural history programming to offer fresh insight into more-than-human worlds.

Jihoon Kim has considered the 'expanded visions' (Kim 2022: 64) offered by emerging camera technologies in relation to the genealogy of the documentary camera. He notes how major currents, theories and figures within twentieth century documentary – from Vertov's

Kino Eye to Rouch's 'living camera', 16mm handheld camera to cell phone video, Jonas Mekas' diary films to Agnes Varda's essayistic work - have promoted an association between the camera and the human eye (Kim 2022: 68). Bill Nichols identifies the idea of the camera as a prosthetic for human vision as a central paradigm within documentary – 'to speak of the camera's gaze' he points out, 'is to…mingle two distinct operations: the literal, mechanical operation of a device to reproduce images and the metaphorical, human process of gazing upon the world… As an anthropomorphic extension of the human sensorium the camera reveals not only the world, but its preoccupations, subjectivity and values' (Nichols cited in Kim 2022: 66-67).

However, this is not the only way that the documentary camera has been understood. Kim also shows how a counter current has been at play within twentieth century documentary, an alternative conception of the camera which documentary pioneer Vertov also promoted, as a device with the ability to gather and record 'impressions in a manner wholly different than the human eye' (Vertov cited in Kim 2022: 69). Kim notes how Grierson too celebrated this idea of the camera's 'magical fact' that 'picks out what the director does not see at all' (Grierson cited in Kim 2022: 69), and filmmakers from Ivens and Ruttman to Godfrey Reggio have engaged with the camera as equipment able to reveal the world in ways that the human eye cannot. While acknowledging then that the camera has long been seen as a device that can enhance human visuality, we can also note a growing profusion in the twenty-first century of imaging technologies that don't involve a lens or a person looking through a viewfinder and consider their epistemological and affective implications. Kim sees in drones and Go-Pros, for example, the capacity to 'capture the world in motion in ways that diverge from the human being's framing and focalization' (Kim 2022: 71), and argues that these 'offer either a refreshed or denaturalized view on our human world or a picture of the world in which the human is decentred and instead interacts with animals and objects on the same plane of existence' (Kim 2022: 72). This denaturalisation of the human perspective is intensified within the immersive experience of VR. Deployed within *In the Eyes of the Animal,* as the dominant visual technology within the piece*,* the lens-less technolog*y* of lidar - with its 360^0 scope and non-human penetration – does not just decentre but replaces human visuality. While natural history programmes have often deployed *sequences* comprising alternative visualities, always anchored by the explanation

of the human narrator, *In the Eyes of the Animal* is comprised wholly of an unfamiliar and inscrutable visual world, accompanied (after a verbal introduction) by a wordless soundtrack of animal and forest sounds. Entering the work feels like crossing a threshold into a non-human world.

While the visuals and soundtrack are arresting, these are not the only sensory dimensions of the experience. In a Cinematic VR work such as *iAnimal*, while the viewer has the illusion of presence in the image world, the experience is visual and aural only, with the body outside the headset playing no part. *In the Eyes of the Animal,* by contrast, brings a form of proprioception into the experience in the form of vibrations produced by the Subpack – essentially a haptic jacket. Marshmallow Laser Feast also engaged other senses in the experience. When the piece was first exhibited in England's Grizedale Forest it was presented at the end of a forest walk, and the physical elements of the forest – the moss, grass, the forest floor itself - were integrated into the experience through touch and smell – creating the type of hybrid physical/digital experience known as Mixed Reality (MR). Within nonfiction VR then, multiple sensory registers displace the visuality that has dominated media to date, reflecting a cultural emphasis on sight that, as Brian Winston (1996) has shown, can be traced right back to the invention of perspective in the Renaissance.

In *Treehugger – Wawona* (2017), an MR[iv] installation that celebrates the Californian native Giant Sequoia tree, launched two years later, Marshmallow Laser Feast developed their exploration of the multisensory potential of immersive documentary. Donning a VR headset, the immersant leans into a cavity within a foam model of a section of a Sequoia. Scent is dispensed within the headset, custom-made to evoke the forest. Visuals show a Giant Sequoia scanned through lidar – first seen from outside, then from within. As computer graphics visualise flows of water and nutrients up through trunk to the leaves, the embodied experience of hugging the tree melds with the visuals and the scent, and the immersant feels as if swept up in the life-sustaining processes within this huge, ancient being. In the twentieth century, nonfiction media informed us, showed us remote things and places, enabled us to hear recordings of human voices and of faraway locations, anchored in the explanations of a human narrator.

In Cinematic VR experiences such as *iAnimal*, as I have argued elsewhere (Rose 2018 n.pag) despite the discourse of being there, the disembodied eye is still the locus of knowledge, while the rest of the body plays no role. In *Treehugger; Wawona*, by contrast, interactive media technology engages the body in multiple sensory registers – with sight, scent and touch all at play. Commentators have discussed the tension between presence and absence that is a feature of immersion within 360^0 video.[v] In *Treehugger: Wawona*, this tension is resolved, with proprioception operating, I believe, as a form of suture within the experience. When I encountered the work, while fully aware that I was embracing a model of a Giant Sequoia, the embodied act of that hug also suggested a feeling of connection to another species that left a trace which has affected how I feel and think about trees. With media criticism dominated by visual and textual interpretation, how might we theorise this type of mediated sensory engagement with documentary? What critical frameworks might assist us in analysing this type of embodied media experience?

As immersive VR expands media experience beyond the visual into other sensory dimensions, phenomenological film scholarship provides a significant reference point and resource. Building on Merleau-Ponty's philosophy, phenomenological accounts (Sobchak 1992, Marks 2000) place the body and embodied knowledge at the heart of all cinematic experience. While it is commonplace to recognise that viewers experience a visceral relationship to certain cinematic genres – horror, pornography, 'weepies' [sic] - a phenomenological account makes the case that all cinema operates on us through the body. As Laura Marks explains, "…our experience of cinema is mimetic, or an experience of bodily similarity to the audio-visual images we take in. Cinema is not merely a transmitter of signs; it bears witness to an object and transfers the presence of that object to viewers" (Marks 2000: xvii)

Marks defines mimesis - from the Greek mimeisthai 'to imitate' - as a form of indexical representation in which one represents a thing by acting like it, through 'a particular material contact at a particular moment, such as that between a child at play and an airplane' (Marks p 138). Like the child holding the plane, material contact with the model tree in *Treehugger* provides a sensuous connection to an imaginary object without the mediation of language. Marks draws the image of the 'child at play and the aeroplane' from

Walter Benjamin, and discusses how the Frankfurt School, in which he was a leading thinker, valued sensuous knowledge as a form of nonalienated experience. Critiquing the dominance of sight as the locus of knowledge in the western tradition, they sought a return to mimetic representation 'in order to shift emphasis from the world of abstraction to the concrete here and now' (Marks 2000:140). For Adorno and Horkheimer, Marks suggests, mimesis 'is a form of yielding to one's environment, rather than dominating it' which 'offers a radical alternative to the controlling distance from the environment so well served by vision.' (Marks 2000: 140) Marks calls the forms of knowledge derived from embodiment 'tactile epistemologies' (Marks 2000: 138). These, she writes, 'conceive of knowledge as something gained not on the model of vision, with its connotations of dominance, but through physical contact' (Marks 2000: 140). Tactile epistemology then provides an apt conceptual framework through which to consider the forms of knowledge production at play within the multisensory engagements emerging within VR and MR nonfiction.

Movement is, of course, a fundamental means through which we inhabit, explore and know the physical world. 6DoF VR platforms incorporate forms of movement unfamiliar from the experience of 20th century media. Through positional tracking, virtual environments can be mapped onto physical space, so that a participant can move around while in VR, and the virtual world within the headset will respond to their real-world actions. *We Live in an Ocean of Air* (2018) – the final part of MLF's informal trilogy – further develops their exploration of multisensory VR and of the entanglement between people and the more-than-human world – with movement and the sharing of virtual space with others at the heart of the experience. *We Live in an Ocean of Air* revisits the Giant Sequoia Tree and the forests of the US Pacific Northwest in which it grows. A fifteen-minute experience accommodating up to five people at a time, the work deploys a unique combination of technologies. Visitors are kitted out with a VR headset, heart rate and breath sensors. Within the work, they encounter and explore a forest, luminously represented through lidar scanning, and experience their connection with their environment in a unique way – as visual renderings of their inhalation and exhalation manifest what is usually invisible - the porousness between the human self, the air around us and other living beings. *Treehugger* and *We Live in an Ocean of Air* are works in which the immersant explores a virtual space rather than one in which they follow a narrative. Neither project includes the human voice.

While some context is offered in the form of an introductory voice over, immersants aren't told what to do or what to think by a narrator. Visuals and sound are important dimensions of the works, but the works can't be understood through these alone. Instead, they provide experiences of tactile epistemology, with meaning emerging as the immersant explores their media environment and pays attention to the effects that their multisensory interaction produce. Knowledge isn't gained through mastery but through openness, even vulnerability. The embrace which is the central experience of *Treehugger; Wawona* provides a particularly apt instance of this form of knowledge production that Marks has called 'a compassionate involvement with the world' (Marks 2000:141) or Michael Taussig has termed a 'yielding-knowing' (Marks 2000: 141).

Interactive VR and the Umwelt

In 1909 German-Baltic zoologist Jacob von Uexkull coined the term Umwelt to describe the distinct lifeworld of each living creature. The term draws on the German welt – which means world or universe, but the concept goes further than describing the distinctive surroundings within which different species live. Instead, it proposes a dynamic in which the lifeworld of each animal is not experienced through but constructed by their perceptual apparatus. 'As the spider weaves its thread, every subject spins his relations to certain characters of the things around him, and weaves them into a firm web that carries his existence.' (Uexkull 1957:14) According to Uexkull, each animal lives within its own sensory bubble, alive to the features within its environment that its sensory apparatus and activities engage, but oblivious to others. In his often-cited explanation of the Umwelt, von Uexkull conjures the world of the tick - hanging on a grass stem for perhaps years at a time, in wait for a passing mammal, responsive only to precise forms of heat, touch, and smell – its distinct perceptual bubble. The concept of Umwelt has recently been gaining attention for its potential to upturn the dominant human view that what *we* see and feel *is* the world. The idea is central to *An Immense World*, Ed Yong's award-winning 2022 study of animal senses. Yong sets out the concept of umwelt through the metaphor of a house, with each sense as its own window onto reality. In Yong's conception, 'the human's house might be bigger than the tick's, with more windows overlooking a wider garden, but we are still stuck inside, looking out. Our Umwelt is still limited…It is all that we know, so we easily mistake it

for all there is to know.' (Yong 2022: 6) Philosopher Brett Buchanan spells out the radical epistemology within Von Uexkull's concept, describing it as 'a new way of thinking about reality as such' (Buchanan 2008: 2) that challenges the very idea of a single physical world.

In the final chapter of her study of animals and nonfiction cinema, *Regarding Life* (2016) Belinda Smaill introduces Uexkull's concept and considers the possibility of producing a 'nonhuman filmic world' (Smaill 2016: 153). For Smaill the relational concept of Umwelt is incompatible with the ontology of the photographic image which loses its status as 'a reliable indicator of reality in the case of nonhuman umwelt' (Smaill 2016: 155). 'With no objects that are stable or consistent across different Umwelten, and no shared physical field, the discourse of the real that structures the expectations and institutions of documentary must be rethought.' (Smaill 2016: 155). 'Considering how the concept of the Umwelt might be transposed onto cinematic representation and spectatorship', she therefore argues,' presents a revolutionary proposition.' (Smaill 2016: 154)

While cinematic documentary is unable to reflect the relational properties of the umwelt, 6DoF VR can lend itself to the task, with algorithmic design and interactive experience able to give expression to the dynamic nature of Uexkull's concept. While recognising that any media created for the human sensorium will, at best, only gesture towards representing the world as experienced by other species, the three projects by Marshmallow Laser Feast that I've discussed show how post-lenticular visualities, multi-sensory registers, algorithmic design and 6DoF interaction lend themselves to reflections on human entanglement with more-than-human worlds, revealing human symbiosis with other species and earth systems, and in doing so, I would argue, troubling human exceptionalism. They provide glimpses of how immersive documentary might fulfil Smaill's vision of a media that can gesture towards diverse umwelten, 'throw[ing] into relief human ways of knowing and perceiving, triggering a fuller understanding of the specificity of human perception (rather than seeing it as universal)' (Smaill 2016: 155). Here, immersive media introduces a documentary ontology that doesn't promote a sense of mastery over the natural world through the 'god-trick' of 'seeing everything from nowhere' (Haraway 1988: 581) but instead offers a virtual experience of human entanglement, a form of situated knowledge – even though that situatedness may be in a virtual world.

Belinda Smaill assumes that a documentary umwelt would present 'an experimental rather than a popular cinema' (Smaill 2016 :155). It's worth noting that Marshmallow Laser Feast's radical work has in fact proven attractive to audiences, at least in an art world setting. While venues that show VR nonfiction are still few, and many projects have had limited exposure beyond the festival circuit, *We Live in an Ocean of Air* has been a rare audience success story – with international exhibitions including a sold-out six-month run at the Saatchi Gallery in London during which 28,000 people bought tickets to experience the work.

VR Documentary and the Temporal Imagination

The projects by Marshmallow Laser Feast that I've discussed so far point to ways in which the post-lenticular visualities, multi-sensory registers and interactive dynamics of 6DoF VR lend themselves to documentary works that reflect on the relationship between human and more-than-human worlds. The case studies that I've explored show how these technologies and affordances are being employed to reveal human interdependence with other living beings and life-supporting systems in ways that trouble Anthropocentrism. Virtual reality is being harnessed by producers for its capacity to trouble other dominant paradigms too. Some of the most celebrated VR documentary works made to date owe their success to what we might characterise as virtual time travel. *Assent* (Raby 2013) *Travelling while Black* (Williams 2019), *In Pursuit of Repetitive Beats* (Emerson 2022) – these award-winning works have all involved bringing immersants into virtual encounters with historical scenarios. As the present, the past and the relationship between the two have been central concerns within documentary, these projects haven't drawn particular attention for their temporal dimension. The future has however less often been the subject of documentary - the speculative work of imagining a time yet to come seen as at odds with documentary's claim on the real. In this section I will consider how the spatial and experiential character of VR are being employed for speculative works that engage the temporal imagination while also, in significant ways, referencing the real. While space won't allow an extended consideration of these VR time travels, I will introduce them to show how, in this domain too, the affordances of VR are lending themselves to forms of enquiry that are novel for documentary, but pertinent to contemporary political challenges. While the experiential

nature of VR – the feeling of being there associated with presence - has been seen to be at odds with the critical work of documentary, I will consider how time travel engages the experiential character of VR for purposes of critique, in relation to themes of colonial and racial injustice and climate emergency. If the future has emerged as a recurrent focus within nonfiction VR, why is that? What forms of imagination are at play in these VR time travels? In what sense do they claim the real? What forms of criticality might they foster?

An early speculative VR work that garnered considerable international attention and multiple awards - *Biidaaban: First Light* (2018) was produced by Anishinaabe artist Lisa Jackson for the National Film Board of Canada (NFB). On donning the headset, the immersant finds herself in a highly realistic computer-generated version of Toronto, but this city has been overtaken by nature. As the artist's statement describes it, 'Toronto's Nathan Phillips Square is flooded. Its infrastructure has merged with the local fauna; mature trees grow through cracks in the sidewalks and vines cover south-facing walls...' (Biidaaban Official Website 2018, n.pag.). As an immersant in the experience, it's unsettling to be plunged into what feels like a post-apocalyptic scenario evocative of a Hollywood disaster movie, but as you grow used to the dawn light and begin to explore, you start to interpret what you are seeing differently. People are going about their lives - travelling by canoe through the waterways, growing vegetables on the rooves of buildings. You realise that the virtual world you find yourself in isn't one of violence or desperation. City life of a kind goes on.

There is no English spoken in the work. Your exploratory gaze triggers statements in Wendat (Huron), Kanien'kehá:ka (Mohawk) and Anishinaabe (Ojibway) – the languages of the original inhabitants of what was called Tkaronto. These also appear on screen as written texts and in English translation – offering glimpses of Indigenous thought and of thought-systems, of 'relationships to the land, to each other and to time itself'. (*Biidaaban* Official Website 2018, n.pag.). The word, Biidaaban, you learn, means first light but also evokes the idea of the future and the past converging in the present. The work suggests that the modern city is rooted in a settler-colonialism that decimated and displaced peoples, even imposing its own conception of time. The future that *Biidaaban* presents returns the city to those original inhabitants and foregrounds their belief systems – the feeling of being there

framing the contemporary city and today's Euro-Western philosophical certainties as also transitory. While a speculative work, *Biidaaban* engages with documentary concerns through its highly realistic visualisation of Toronto, its citation of Indigenous texts, its reworking of Canada's colonial history. Funded by the National Film Board of Canada, we might think of *Biidaaban* in relation to that institution's founder, John Grierson's definition of documentary as the 'creative treatment of actuality' (Grierson 1933: 8) acknowledging the tension within that idea.

Lisa Jackson is not an isolated Indigenous artist working with VR. *Biidaaban* is one of forty projects documented on the Fourth VR website by Keziah Wallis & Miriam Ross. Alongside Jackson's speculative work, titles including *VR Future Farmscrapers* (2017); *Along the River of Spacetime* (2019), *Future Dreaming* (2018) and *Thalu: Dreamtime is Now* (2018) suggest how temporality has been a significant theme within this field, with VR providing a fertile media environment for explorations of Indigenous Futurism, with its agenda 'to rework and dismantle colonial narratives.' (Wallis and Ross 2021: 320) Although the term Indigenous Futurism overtly speaks to a time to come, Wallis and Ross underline how, as in the case of *Biidaaban*, the worlds of other Fourth VR works also encompass rethinkings of the past and non-linear conceptions of time.

It isn't only Indigenous artists who have embraced VR for its potential for Futurism. *The Changing Same: An American Pilgrimage* (Brewster et al 2021), engages the temporal potential of VR to explore Afrofuturist themes. This ambitious project, envisaged in three parts, is a collaboration between Yasmin Elayat - Emmy award-winning immersive director and co-founder of Scatter – a company that has pioneered volumetric nonfiction storytelling – and multi-award winning documentarians Joe Brewster and Michele Stephenson. Brewster and Stephenson had previously made a short film for CBS about Claude Neal, a 23-year-old farmhand who was the victim of a spectacle lynching in Marianna, Florida in 1934 (Brewster and Stephenson 2019). *The Changing Same: An American Pilgrimage - Episode 1: The Dilemma* (Brewster et al 2021) revisits that dire historical episode as a starting point for what the producers describe as an 'artivist' virtual reality work that 'brings users on a journey through time, traveling with those whose lived experiences included slavery, lynching and mass incarceration, and ending in an afro-futurist tomorrow to confront and

heal our generational wounds' (Brewster et al 2021: n.pag.). A 6DoF version of *Episode 1: The Dilemma* premiered in the New Frontiers section of the Sundance Film Festival in 2021 and won the Tribeca Immersive Award that year.

While the work's visual grammar incorporates computer generated material and fictional scenarios, *The Changing Same VR* is grounded in the real through its sombre historical referent, through volumetric capture of sites where events relating to that lynching took place and through the persona of Lamar Wheaton, who guides the immersant through the experience. Wheaton draws on the Marianna-born poet L. Lamar Wilson, who became aware of this lynching in his hometown when he was a high school student and has dedicated himself to the work of memorializing Neal's death. In *Episode 1 The Dilemma* the immersant finds herself alongside Lamar Wheaton in a heated contemporary incident in which he is wrongfully arrested and plunged into a parallel event in the nineteenth Century in which a Free Black man is unjustly apprehended. The immersant then emerges into an Afrofuturist space-time in which she meets a Goddess-like figure, Harriet, who challenges her positionality in relation to the experience she is witnessing. In this way *The Changing Same* weaves together fact and fiction, past and present – moving backwards and forwards through time to expose and confront the continuum of racial in/justice in America and show how 'the past is never really the past but informs our present and future.' (Brewster et al 2021: n.pag).

While nonfiction producers enthusiastically embraced VR within the Third Wave, scholars have pointed to a tension between VR as a medium and documentary's critical role in relation to social reality. For Bolter and Grusin (1998: 3), Virtual Reality is immersive in the sense that 'it is a medium whose purpose is to disappear' and this quality of VR – the feeling it creates of presence within a world rather than an awareness of observing a representation of reality – is in tension with the work of generating a critical stance towards nonfiction content. One participant in the audience study that we undertook within the VR Documentary Encounters research project illustrated how immersivity made it hard to maintain an awareness of the editorial framing within a VR work, and to be alert to the directorial point-of-view, 'It's not the same because you feel immersed in it – you feel like

you've been there - …and you feel like you know about it; but actually, you just know one person - one filmmaker's - perspective.' (Green et al 2021: n.pag.)

These are valid and significant concerns in relation to the representation of contemporary people and social reality. Social documentary stakes its claim to relevance on forms of intervention within the discourse of the real that encourage a critical response in audiences towards aspects of our shared world. I would, however, suggest that the speculative works I've discussed in a sense subvert this problem taking advantage of these same affordances – immersion, presence - to generate critical distance in regard to the status quo. As Maria de la Bellacasa (2017: 52) points out, discussing the future as a theme within creative work, 'Affirming the speculative as a general orientation…presupposes a critical approach to the present. Why would one want other possible worlds, if nothing was wrong with this one?' Afro - and Indigenous Futurisms are creative practices that have emerged in the contexts of white supremacy and settler-colonialism, with imaginative time-travel harnessed to throw light on the slow violence of these systems, and Indigenous and African cosmologies taken up as resources of resistance in imagined alternatives. Immersive time-travels such as *Biidabaan* and *The Changing Same* thus show how the affordances of VR can lend themselves to a critical stance in relation to the present and support what we might think of as a longue-duree historical perspective.

VR Documentary and Structures of Feeling

As a documentary platform, VR has also been the focus of criticism for its orientation towards emotion, and its privileging of feeling over thought (Uricchio 2016). Encouraged by Chris Milk's 'empathy machine' rhetoric, VR was taken up within the tradition that Brian Winston has termed the 'victim documentary' (Winston 1998), with presence harnessed for projects that stage virtual affective encounters with suffering others, such as those affected by war - *On the Brink of Famine* (2016); human trafficking – *Trafficked* (2016); high fatality infectious disease *Waves of Grace* (2015). While Milk's argument for an inherent link between VR and empathy is deterministic and debatable, the remarkable influence of his TED talk might be more meaningfully understood in the light of its broader underlying insight into the affective resonance of VR experience. However, in all of the case studies

that I've discussed in this chapter, I would suggest that artists are engaging that affective potential of VR not for the sake of emotion itself, but in service of forms of critical awareness that feeling might encourage. While pathos is crucial to the *iAnimal* series, for example, its purpose is not to generate an individualistic emotional response, the 'feeling good about feeling bad' (Nakamura 2020) that Godmillow (1999) has suggested is the affective specialism of the 'Liberal Documentary'. The intention is rather to harness feeling to provoke criticality towards a prevailing idea, the Anthropocentrism that finds expression in the system of factory farming. Similarly, in Episode 1 of *The Changing Same: The Dilemma,* when the immersant finds herself as if alongside Lamar Wheaton in the back seat of a police car, virtual witness to his wrongful arrest, the situation is intended to provoke powerful feeling, not for feeling's sake, but rather to draw attention to racial injustice as well as to the immersant's positionality in relation to that power dynamic. In an interview for XR Must, Brewster, Elayat and Stephenson set out the predicament that gives Episode 1 its title and which the episode seeks to pose for the immersant; 'Are you going to be conscious and aware, and make the decision to stay and join the rewriting of our common narrative or do you prefer to bury it all and leave?' (Pietrobon 2021: n.pag.)

While the work pivots on engagement with the emotions of the immersant, we can see that the creators' intent is to offer situated virtual experience that then impacts consciousness. We might therefore think about the operation of these works conceptually through the lens of what Raymond Williams called 'structures of feeling' (Williams 1977:132) – that is feeling being considered not as an individual human emotion but rather as a historical and cultural phenomenon – as the shared attitude of a particular era. 'The term is difficult' Williams explains, 'but feeling is chosen to emphasise a distinction from more formal concepts of 'world-view' or 'ideology'…we are concerned with meanings and values as they are actively lived and felt…not feeling against thought, but thought as felt and feeling as thought: practical consciousness of a present kind, in a living and inter-relating community.'(Williams 1977:132) Williams goes on to delineate a variety of roles that the arts can play in relation to shifts in structures of feeling. 'Creative practice is [thus] of many kinds…' he suggests, 'It can be…the reproduction and illustration of hitherto excluded models; the embodiment and performance of known but excluded and subordinated experiences and relationships;

the articulation and formation of latent, momentary, and newly possible consciousness.'
(Williams 1977: 212)

The audience effect of the projects that I've discussed can be understood, I believe, through the lens of Williams' taxonomy. Looked at in this light *The Changing Same* works to offer a virtual experience that awakens in the immersant an awareness of and responsibility in relation to the subordinated experience of racial injustice. *Biidabaan* brings the immersant into a situation that similarly surfaces consciousness of subordinated experience - of the Indigenous peoples of North America – while also introducing a novel feeling of ease in what we might see as a post-consumerist landscape. Meanwhile, the embodied encounters created by Marshmallow Laser Feast push against an individualist metaphysics by encouraging the consciousness of human interdependence with other living things.

I'll conclude by pointing to an innovative VR nonfiction project that draws together several of the threads that I've explored, taking advantage of the experiential and interactive but also, uniquely among my examples, the emergent affordances of 6DoF VR, to address structures of feeling in relation to the environmental impact of climate change. Ben Andrews and Emma Roberts' *Gondwana* (2021) is a simulation, a speculative forecast of the future of the world's oldest tropical rainforest – the Daintree Forest of Northern Queensland - which is experienced as a room-scale work in an exhibition context. The project unfolds through a procedurally created computer-generated landscape that renders climate data and predictions up to the year 2090, in response to the presence and interaction of the immersant. In each iteration, as the website explains, a different story unfolds, a different future, alternative projections on how things might progress. While departing radically from twentieth century documentary ontology in its interactive and emergent form, the project is still bonded fto the real, through twenty hours of audio recordings that make up its soundtrack, through representation of the flora and fauna of the forest based on sketches and 3D renderings made with tilt brush in a headset in the field, as well as through climate science data, content with an indexical and highly consequential relationship to the historical world.

The artists spent six months off grid in the rainforest developing the concept for the project. During that time, they worked with Kuku Yalanji elders and with scientists, to build an understanding of the ecological and community significance of this ancient site. What became clear from their research conversations was that the phenology of the forest - the timings and rhythms of growth and change that the Aboriginal elders had known - was becoming variable and erratic. The timing of the research trip also drove home the urgency and relevance of the project theme, as it 'turned out to be one of the most extreme wet seasons on record, with unprecedented heat waves that, among other things, killed off a third of an entire flying fox species in a single week.' (Andrews 2023 n.pag.) A stark announcement from the Wet Tropics Management Authority, who are responsible for upholding the World Heritage values of the Daintree, underlined the critical nature of the situation. Andrews and Roberts responded to the understanding that the research trip gave them, and to their own climate grief, by developing a project that employs VR to engage immersants with climate emergency by taking advantage of the medium's affordances for the exploration of space, scale, contingency and above all, time.

On entering Gondwana you find yourself in one corner of the Daintree Forest in the present day. You are free to wander as you choose, and as you do so you pass through diverse ecosystems – trees, mountains, coast. With fifteen minutes in Gondwana equating to one year, you also travel fast forwards in time, experiencing rapid changes of weather and season, with beautiful sunsets and cool sunrises passing in quick succession. As it's never possible to get an overview of the forest or a long-term temporal perspective, the immersant finds themselves unmoored within an unknowably large, unpredictable system, free to explore, but without a map, any overview or any control over unfolding events.

In her ground-breaking discussion of VR and the ecological imagination, Julia Scott-Stevenson considers how the immersive experience of VR has the potential to 'assist in developing a clearer understanding of entanglement' (Scott-Stevenson 2020: 5), by engendering a sense of bewilderment – a concept that strongly resonates with the affective ambience of Gondwana. There's no mastery on offer here, instead the experience produces a kind of unknowing. One's only options are to wander, to observe, to listen. As the artists describe it, their aim was just that, for immersants to 'hear the call-and-response of the

Wompoo dove, to experience the incredible power of a wet season deluge, to understand how the rhythms of the cicadas change as the weather does.' This would then allow them to notice change - 'to feel the difference in the forest when the Wampoo doves no longer sound, when the rainfall is no longer frequent, and when the light in the forest changes as the canopy recedes.'

Many scholars have pointed out that climate crisis is a crisis of time and of the temporal disparity between carbon emissions and climate impacts, between the knowledge of damage and the speed of action, between present and future generations. *Gondwana* brings these normally incommensurable temporalities into dialogue, so that the immersant has a virtual experience of events that will occur across timescales beyond a human lifespan. While the extent and timing of the changes that will befall the Daintree are uncertain, what *Gondwana* makes clear is that every climate scenario leads to the degradation of the forest ecosystem. Through a form of yielding-knowing, the immersant who is willing to dwell in *Gondwana* will witness the loss that human-induced climate change will bring to this virtual ecosystem and, crucially, to its irreplaceable twin in the historical world. While *Gondwana* might seem an unlikely setting for the exploration of values as they are 'actively lived and felt' (Williams 1977: 132), the project offers, I would argue, a form of virtual lived experience that supports 'the articulation and formation of…newly possible consciousness' (Williams 1977: 143), here, consciousness of the critical urgency with which we need to end the age of fossil fuel.

Conclusion

Through an analysis of case studies that offer encounters with temporal imaginaries and more-than-human worlds, I have tried to show how VR nonfiction is evolving in the hands of producers and how the potential of the platform for documentary's work of criticality in relation to the historical world is becoming apparent. Encounters with more-than-human lifeworlds in projects such as *TreeHugger* and *In the Eyes of the Animal* take advantage of media embodiment and interactivity to provide virtual lived experience of human interdependence with other living systems. Futurism has emerged as a recurrent theme within the field, with immersive time-travels such as *Biidabaan* and *The Changing Same*

providing forms of critical distance on the present that work to foreground the longue duree of racial and colonial in/justice. *Gondwana* demonstrates the urgent relevance of VR as a space of temporal exploration in the context of climate emergency. While these projects do engage the emotions of the immersant, I have argued that we can better understand their operation conceptually in relation to 'structures of feeling' and consider them in the light of the ways that they support the emergence of new formations of consciousness. The case studies are suggestive of various directions for future praxis, and producers might well look to Raymond Williams still-relevant taxonomy of the forms of consciousness that creative practice can surface as a resource in devising new immersive nonfiction work.

In 2004, pioneer VR artist Char Davies proposed that immersive experiences might provide, 'a temporary release from our habitual perceptions and culturally-biased assumptions about being in the world, to enable us, however momentarily, to perceive ourselves and the world around us freshly' (Davies 2004: 3). The projects that I've discussed suggest how Davies' vision is being realised, with VR worlds acting as arenas for virtual lived experiences and encounters that encourage new forms of consciousness about the historical world. I have discussed positive use cases. The potentialities of VR are however not intrinsically pro-social, and it is worth stating that they can be harnessed for good or ill. Immersive platforms raise other ethical questions too. The environmental cost and (un)sustainability of production equipment are issues that are pertinent to this discussion that I haven't been able to address within the scope of this chapter.

The case studies I have discussed rest heavily on my own experiences as an immersant, and on commentary by their producers. Empirical research into the experience of nonfiction is required to provide a more robust account of the virtual lived experience and situated knowledges that I suggest VR can offer. However, models for such research are undeveloped. Embodied experience and tactile epistemology present challenges for qualitative research that relies on verbal accounts. There is a need for the development of audience research methods that are suitable to reflect the phenomenological dimensions of multisensory and embodied experience.

It is still early days in the development of VR as a medium, and in the discovery of its potential for nonfiction. Hardware and software are fast developing; exhibition models are still nascent; but we are now seeing creative artists who have developed a grammar of immersive storytelling across multiple projects. The case studies that I've explored are noteworthy in themselves, but they can also be read as signalling wider significant shifts in twenty-first century nonfiction media towards experience and embodiment, bringing with them, as I have argued, opportunities for the development of formations of consciousness supportive of post-carbon futures.

Acknowledgement

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[i] These critiques were in evidence at Visible Evidence 2023 in papers including 'The Exclusionary Reality of Virtual Reality Technologies' by Lynessa Parks and a panel on 'An Opaque Transparency: Debunking the Rhetorics of Virtual Reality Documentary' chaired by Pietro Conte.

[ii] Within the Virtual Realities research project funded by the UK's Engineering & Physical Sciences Research Council (2017- 2020), I was part of an inter-disciplinary team of researchers from Computer Science, Experimental Psychology and Documentary Studies who collaborated to explore what the third wave of VR might mean for nonfiction. To reveal the extent and shape of the emerging field, and provide a shared resource for study, we developed the Mediography of VR Nonfiction (Bevan et al 2019) - a database of over 600 English language projects made between 2012

- when VR Journalism pioneer Nonny de la Pena showed the VR work *Hunger in Los Angeles* (de la Pena 2012) at the Sundance Film Festival - and 2018. While not a comprehensive survey of the field, the mediography provides a valuable snapshot of the first years of nonfiction VR and is suggestive of nonfiction producers' desires for this nascent medium.

[iii] While none of the participants in our study had seen *iAnimal* themselves, the series was, notably, mentioned by a number of them, as they knew people who had seen programmes in the series and been strongly affected by them.

[iv] Mixed Reality and multi-sensory works are usually location-based experiences – LBES as they are known - interactive 'room scale' installations that are not easily accessible – experienced at festivals, in galleries, and in the still rare but increasing number of exhibition spaces that are dedicated to immersive creativity - the Phi Centre in Montreal and BOCS in Cardiff, Wales, among them.

[v] A feeling of simultaneous presence and absence from on-screen events has been dubbed the Swayze effect, referring to Patrick Swayze's role in the 1990 film 'Ghost'.