Article

E Nature and Space

EPE: Nature and Space
1–22

DOI: 10.1177/25148486241284176
journals.sagepub.com/home/ene


Viral ecologies: Resurgent nature, COVID-19 and the discourse of transgender contagion

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Abstract

During the early days of the COVID-19 pandemic, popular narratives of a 'resurgent nature' and portrayals of the virus as a form of 'revenge' prompted geographical reflection on the promises and limitations of ecological perspectives on the SARS-CoV-2 virus. Revisiting these reflections in the light of what we have learned from the pandemic, this article asks what is to be gained by attempting to think critically *with* the virus about human space as multispecies composition. Thinking ecologically with the virus can become a method for critically reconsidering naturalised and dualistic orders of exclusion and inclusion, health and unhealth, or belonging and unbelonging. Specifically, we focus in this article on the overlap of immunological and trans-antagonistic discourses with viral imaginaries of the pandemic, exploring the paradox of vulnerability that arises at this point of intersection. COVID-19 simultaneously highlights humans' mutual vulnerability as a horizontalising force and amplifies differential social vulnerabilities. In examining this paradox of vulnerability as it relates to viral discursive constructions of transness, we explore tensions between different modes of engaging, identifying and thinking with the virus in recognition that the social and the ecological cannot properly be considered as separate domains. The aim is not simply to propose an extended epidemiology that takes into account the complex human–nonhuman entanglement, but to explore the social, cultural and political implications of pandemic vulnerabilities and of thinking ecologically with the virus. We trace the shared conceptual underpinnings of ecological and immunological thought, showing that these same conceptual lineages manifest in political responses to the COVID-19 pandemic and exploring how they are expressed

†Sage Brice and Felix McNulty co-wrote this article and jointly developed the presented analysis. Sage Brice conceived the initial conceptual framework and secured project funding.

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in queer- and trans-antagonistic discourse and policy. Building on these analyses, we develop a proposal for 'transing' the virus and a model for 'thinking ecologically' that is simultaneously liberatory, messy and agnostic.

Keywords
Trans ecologies, environmental justice, nature, post-humanist thought, coronavirus

Introduction

The early days of the global COVID-19 pandemic prompted a proliferation of scholarly interventions speculating on the pandemic's critical implications for human geography and beyond (J Brice, 2020; Eaves and Al-Hindi, 2020; Lunstrum et al., 2021). Among these, some focussed specifically on the imbrication of social and ecological dimensions of the pandemic, raising the question what it might mean to think with the SARS-CoV-2 virus in an ecological mode. Writing now at an interval when public responses to the COVID-19 pandemic have largely dissipated even as the virus itself persists in circulation to unevenly devastating effect, this article revisits those early cautions and provocations in order to think critically *with* the virus about human space as multispecies composition. As we will show, thinking ecologically with the virus can become a method for critically reconsidering naturalised colonial and dualistic orders of exclusion and inclusion, health and unhealth, or belonging and unbelonging. Though it is questionable to what extent the pandemic has meaningfully reconfigured human relations with a 'nature' outside of the human, the virus certainly shines critical light on the 'nature' of human relations, in the dual sense that it troubles naturalised societal orders of difference and identity *and* that it exacerbates the patterns of exclusion, exploitation and harm that underpin those orders of differentiation.

Our interest in developing the concept of a viral ecology is thus not simply to propose an extended epidemiology – one that takes into account the complexity of human/non-human entanglement – but to explore the social, cultural and political implications of thinking in this manner with the virus. Thinking *with* the virus involves recognising the virus as both a *figure* and a *site* of material entanglements that together radically unsettle the constitutive boundaries of life and non-life, belonging and unbelonging. Specifically, we focus in this article on the intersection of immunological and trans-antagonistic discourses with viral imaginaries of the COVID-19 pandemic, exploring the paradox of vulnerability that arises at this point of intersection: while COVID-19 foregrounds a condition of universal and mutually constitutive vulnerability, its impacts reflect and amplify pre-existing, inequal vulnerabilities for marginalised groups, to devastating effect. We propose a viral ecological framework in this paper as a means of engaging with the seriousness of these effects and the discourses, structures and systems that produce them while avoiding reductive attempts to 'identify' straightforwardly with the virus or virality as a mode of political thought and organisation.

Thinking ecologically as a relational paradigm is not a straightforward proposition. It does, however, represent a critical threshold of geographical thought, one that is brought into particular clarity by the pandemic context. Writing in response to an upwelling of popular and critical narratives of 'resurgent nature' that figured COVID-19 variously as a form of 'healing', 'revenge', or 'natural justice', Adam Searle and Jonathon Turnbull sought to tease out the promise from the dangers inherent in the application of ecological perspectives to understandings of the virus, noting that popular imaginaries of the pandemic at the time were 'dangerously imbuing nature with a vengeful morality atoning for anthropogenic environmental sin' (2020: 291; see also Bosworth, 2022). Narratives of nature's 'return' implicitly position nature in opposition to the

human (2020: 292) drawing heavily on colonial imaginaries of nature as distinct from – and devoid of – human inhabitants, obscuring the differential impacts and significance of the pandemic. Appeals to the pandemic as a form of natural justice thus ignored, obscured, or – worse still – helped to naturalise a range of fundamentally social, political and geographical *in*justices which, to a great extent, directed the differential global and local impacts of the virus.

At the same time as drawing attention to this 'alarming discourse', however, Searle and Turnbull noted also a generative potential in ecological storyings of the COVID-19 pandemic. Thinking ecologically *with* the virus, they proposed, offered a way to 'publicly reimagine "human spaces" as multispecies compositions' (294) and to attend anew to the differential effects of the pandemic across human/non-human divides. Likewise, Elizabeth Lunstrum et al. (2021) attempted to sketch out, through a series of critical vignettes, the social and geo-political stakes for multispecies geographies of COVID-19, indicating the extent of bio- and necro-political devastation alongside points of tentative hope. They proposed a cautious orientation towards 'anti-colonial humility' as a guide for necessarily complex efforts 'to restructure economies and related human-environment encounters in ways that avoid potentially dangerous intimacies seen in industrial agriculture […] but without reproducing colonial patterns of dispossession and related fantasies that separate human and non-human realms' (Lunstrum et al., 2021: 1519–1520).

Evidence from the pandemic that rapid change is possible at a global scale might, optimistically, lend impetus to envisioning a resurgence rooted in 'multispecies cooperation, cultivation and care to foster more liveable futures' (Searle and Turnbull, 2020: 294; see also Akómoláfé, 2020; Lewis, 2020). It is also possible to identify a 'critical moment' in the early days of the pandemic, marked by large-scale (albeit inadequate) shifts in popular political perspective such as those generated by Black Lives Matter following the murder of George Floyd (Lunstrum et al., 2021). The 'Nature is healing' narrative in social media, as Bosworth (2022) points out, went on to spawn a genre of ironic memes that played on varied understandings of the 'natural'. Each of these interventions engages with the contention that thinking critically about 'nature' in the context of COVID-19 does carry liberatory and anti-normative potential.

Numerous attempts have been made to address the paradox that the COVID-19 pandemic (like other environmental crises) both highlights humans' mutual vulnerability as a horizontalising force *and* amplifies differential vulnerabilities brought about through social dynamics of exclusion, violence and entanglement (Eaves and Al-Hindi, 2020). Scholars have considered this paradox in relation to specific vectors of marginalisation, including race (Gauthier et al., 2021), migrant and refugee status (Molenaar and Van Praag, 2022; Tazreiter and Metcalfe, 2021), poverty (Ogbogu, 2023; Stevano et al., 2021), disability and chronic illness (Pieri, 2022), LGBTQ+ communities (Altay, 2022) and non-conventional households (Pienaar et al., 2021). In this article, we consider more closely the substance of this paradox in relation to discursive constructions of transness,[1] noting that viral analogies and metaphors as well as discourses of a proper natural order have been emphatically mobilised against social acceptance of – as well as legal rights and protections for – trans people.

In examining the paradox of vulnerability highlighted by the COVID-19 pandemic as it relates to transness specifically, we explore tensions between different modes of engaging, identifying and thinking with the virus in recognition that the social and the ecological cannot properly be considered as separate domains. Entanglement alone does not constitute an ethical or political project; nor does the figure of the virus offer a simple exit from oppressive binary systems (Kirksey, 2019; Povinelli, 2021). To elucidate this point, we consider two separate but related genealogies. We first trace the shared conceptual underpinnings of ecological and immunological thought, showing how these manifest in political responses to the COVID-19 pandemic. We then explore how these same conceptual lineages are expressed in queer- and trans-phobic discourse and

policy in ways that echo, and in some cases contribute to, pandemic injustices. Building on these analyses, we develop a proposal for 'transing' the virus and a model for 'thinking ecologically' that is simultaneously liberatory, messy and agnostic.

On the genealogy of viral ecologies

What, then, is at stake in considering the viral through an ecological lens? Viral narratives[2] of nature's recovery during COVID-19 are frequently framed in terms of naïve surprise, as though the return of animal life in the space absented by suspended human activity were at once both un-looked-for and inevitable.[3] Though these narratives present themselves as novel, the association between epidemiological and ecological imaginaries has a long history. Both hinge upon an understanding of life as fundamentally competitive; an arena in which the struggle for ascendance plays out between populations conceptualised as coherent and unified bodies. It is worth considering this genealogy in order to better understand what is at stake in the figuring of pandemic disaster as a process of natural rebalancing.

Historically, scientific study of the spread and management of disease took shape in the context of rapid urbanisation, colonial expansion and the forced translocation of enslaved people, mainly from Africa to the Americas. 'Since the late 19th century', as Dixon (2021: 34) points out, 'a concern for the reach of pathogenic viral matter into human bodies has emerged as a deeply colonial project, with fears over the transformation of endemic diseases into epidemic ones conjoined with cautions of population decline in the colonies and disrupted trade routes'. Indeed, while the scientific disciplines of virology and ecology both came into being in the late 19th and early 20th centuries, the conceptual milieu from which they emerged was one of reckoning with a newly intimate and violent world (dis)order of colonial exchange that emerged over the course of the preceding two centuries.

The wholesale movement of bodies – people – between continents and their insertion into unfamiliar environments frequently brought illness and death, presenting novel challenges to Western science and governments alike. Domestically, accelerating urbanisation led to recurrent outbreaks of infectious diseases such as cholera, which threatened both to decimate the workforce and to spark civil unrest (Susser and Bresnahan, 2001). In colonised lands, the susceptibility of European settlers and imperial forces to unfamiliar diseases presented similar challenges, provoking anxieties about the collective constitution of racial and national bodies or populations (Anker, 2009; Arnold, 1996). The transportation of enslaved people to the Americas and their subsequent cruel exploitation came at a high cost in human lives and thus also in economically valuable 'assets'. Urbanisation and colonisation were thus fraught projects whose profitability and governability were threatened by the emergence of unfamiliar diseases among their newly intimate and crowded human populations (Downs, 2021; Watts, 1999).[4] Rather than address the conditions of exploitation, inequity and deprivation that gave rise to these new challenges, the emerging science of epidemiology sought instead to make sense of the mechanics of spatial distribution – and the geographical relationships – governing the impact and spread of epidemic diseases.

The origins of ecology are similarly entangled in processes of colonial exploration, the administration of empire and the rationalisation of domestic food production to support growing populations at home and abroad (Anker, 2009). The 18th-century Swedish naturalist Carl Linnaeus, best known for initiating the systematic taxonomy of species, also identified the need for a coherent study of inter-species and environmental relationships (Egerton, 1977). One formative direction in early ecological enquiry was the collection and categorisation of 'exotic' species (particularly of plants suitable for cultivation and exploitation) and the study of their adaptation to different environments, as in Alexander von Humboldt's theorisation of the relationship between climate and vegetation zones (Goodland, 1975).[5] Other influential developments

included Charles Darwin's theory of evolution, as well as Antoni Van Leeuwenhoek's conceptualisation of the food chain and his study of the life histories of insect agricultural 'pests' as a possible route to outbreak control (Egerton, 1977). Here the intersection of the two sciences becomes clearly apparent; Leeuwenhoek is also a key figure in the histories of epidemiology and virology.

The advent of population

The modern sciences of epidemiology and ecology are distinct from the scholarly lineages which preceded them in that both require a concept of *population*. This concept marks a shift in the study of non-human life, from natural history (a largely descriptive and/or theological concern) to the study of relationships among and between communities living in proximity, and of the effect of those relationships on the changing makeup of the overall population within a given environment.[6] Similarly, in the study of human disease, population marks the shift from the private sphere of the body to the public sphere in which pathogens are distributed and spread within and across populations.

Alongside the introduction of population, both disciplines also helped to establish the notion of an underlying natural order: an ideal state that precedes disturbance and to which the body, population, or ecosystem will naturally return with proper administration of care and control. German scientist Ernst Haeckel first defined ecology as 'the body of knowledge concerning *the economy of nature*', in direct reference to an Aristotelian intellectual lineage that assumes the governing influence of a 'natural balance' associated with an abstracted national body (Haeckel, 1870, quoted in Egerton, 1977: 189, italics added; Müller-Wille, 2014). Ecological disturbance and disruption are thus conceived not as natural engines of change but as threats to the economic stability of pre-given, natural populations (Anker, 2009).

Ed Cohen (2011: 22), writing on the 'paradoxical politics of viral containment', observes that a similar elision of 'natural' with 'economic' order – and of the individual body with the body politic – underpins also conceptions of the viral threat: 'insofar as it comes to represent the "virulent agent" of epidemic-causing infectious diseases, […] the "microscopic parasite" not only biologically but also *politically* threatens the organism's "economy"'. Although viruses as we know them today were not identified or isolated until the very end of the 19th century, the 'bio-logic' that construes infectious disease as both parasitic and invasive predates scientific knowledge of viral anatomy, and still largely determines the framework through which viruses are imagined and conceptualised. The virus is, politically speaking, 'undesirable precisely insofar as what the host most desires is clarity of borders, a certain distinction between boundedness and unboundedness […] that viral infection threatens to disrupt' (Cohen, 2011: 23).

The containment of viral threat thus becomes an exercise in protecting and demarcating the bounded self-identity of specific populations, and their relative positioning within an established political order.[7] As Dixon (2021: 34) points out, 'the life-affirming rhetoric of health, so often the basis for policy, has long obscured what was in fact a selective nurturing of some, and, indeed, the suffering of the many that such policies have often helped engender'. Established in the process is the sense of a natural order of belonging and unbelonging, in which the body politic is established as a proper entity through the exclusion of elements construed as undesirable or harmful to the health of the whole. While it is evident that both epidemiology and ecology are intended to increase understanding of the complex entanglement and inter-dependency of species, environments and communities, their reliance on immunological imaginaries of purity, containment and stasis belie that intention. The centrality of these imaginaries indicates the extent to which these disciplines are mobilised towards aims of separation, control and insularity (Esposito, 2008; Mutsaers, 2016; Shotwell, 2016).

Rethinking 'natural justice'

Seen in this historical context, it is clear the ecological and immunological imaginaries underpinning viral narratives of pandemic resurgence derive their sense of inevitability from a colonial lineage that subsumes modes of violent exclusion and dispossession within a logic of natural balance and order. The idea of an overarching system which seeks (teleologically) to redress any disturbance to that natural order is the starting point for popular narratives that imagine the pandemic as a form of natural justice, or 'nature's revenge' (cf Stengers, 2015). In their most iconic form, such narratives construe humans as 'the real virus': a pathogenic agent of which the earth (imagined as an organism) seeks to cleanse itself through the mechanism of zoonotic disease. It is perhaps not difficult to recognise a certain righteous appeal in such narratives (Fair, 2021), which produce a sense of aloof detachment from the actual human costs of climate and environmental collapse (and of pandemics) and relieve the storyteller of responsibility by casting 'nature' as an omnipotent entity capable of undoing on its own terms the harms exacted by human abuse and misuse.

The illusory appeal of a natural justice speaks, however, to the wider historical context outlined above. Humans are, of course, not jointly and equally responsible for histories of ecological degradation and harm, nor for the ongoing effects of extractive global economies which disproportionately benefit people in the Global North (Shotwell, 2016; Sultana, 2022). Casting humans as a single, homogenous entity obscures the uneven distribution of responsibility for and impacts of climate change and environmental degradation (Liboiron, 2021; Ngcamu, 2023). While it is difficult to establish clear parameters for global comparisons, within the Global North it appears clear that the COVID-19 virus has also disproportionately impacted racialised and other minoritised groups (McGowan and Bambra, 2022; Varkey et al., 2022). The notion of the pandemic as a form of natural justice thus obscures the overwhelming and ubiquitous *in*justice that characterises the distribution of benefits, responsibility and harm for and from environmental destruction in general as well as the uneven impacts of the virus itself.

The depiction of humans as a pathological threat also rings alarm bells for historic reasons. Images of natural threats such as disease, pests, or parasites have historically been used to de-humanise groups such as Jews, migrants, refugees, or LGBTQI+ people and to stir up fear and hatred of othered communities. The HIV/AIDS epidemic, too, was narrativised as a form of vengeance – sometimes construed as divine intervention – and the disease was initially minimised, construed as 'cleansing' society of 'unnatural' romantic and sexual behaviours (Murphy, 1988). Once it became apparent that anybody could be susceptible to HIV, LGBTQI+ communities were then blamed for carrying and spreading infection (Cifor, 2022; Schulman, 2021).

For all these reasons, caution is needed when attempting to theorise the pandemic in ecological terms. Nevertheless, numerous ecological perspectives remain relevant to a consideration of viral pandemics. First, it has been suggested that environmental factors – high intensity animal husbandry, habitat destruction, rapid urbanisation and population density – contribute to the emergence and spread of novel contagious diseases (Mishra et al., 2021). Second, the virus can itself be regarded as an environmental factor, one that impacts and affects dimensions of social life by amplifying social inequalities (Finn and Kobayashi, 2020), producing differential health outcomes (McGowan and Bambra, 2022), or even precipitating the emergence of new mutual aid practices (Mould et al., 2022). Finally, the encounter between humans and the virus can be considered in terms of its implications for questions of subjectivity, vulnerability and relation. It is in this latter sense that we put forward here the project of thinking ecologically *with* the virus, to better understand the paradox of vulnerability made apparent in conditions of ecological interdependence.

Paradoxical vulnerability and COVID-19's impacts on trans communities

Writing about the different ways in which vulnerability has been conceptualised over the course of the COVID-19 pandemic, Mara Pieri (2022) describes COVID-19 as functioning initially to 'short circuit' normative schemas and reframe vulnerability as a mutual and reciprocal condition of human experience. However, despite initial tentative hopes that the pandemic could represent 'a level to flatten social inequalities', Pieri (2022: 107S) observes instead that 'the pandemic has functioned as an accelerator that enhances pre-existing disparities and hastens their effects'. Pieri (2022: 112S) traces this acceleration through the reinstatement of able-bodiedness as a 'compulsory and preferable option', with the deaths of 'at-risk' or 'vulnerable' groups framed as of lesser consequence in ways that reinforce rather than undermining oppressive systems and structures.

Since the beginning of the pandemic, research has also highlighted disproportionate rates of COVID-19 related death for people and communities of colour, particularly for Black people in Western contexts (Crockett and Grier, 2021; Karaca-Mandic et al., 2021). Crockett and Grier (2021: 90) assert that long histories and legacies of racism and racialised austerity in the US positioned Black, Latinx and Indigenous populations 'to suffer the worst effects of every public crisis'. Similar disparities have been identified in the UK (Aldridge et al., 2020; PHE, 2020). Even as COVID-19 rendered the effects of organised abandonment (Gilmore, 2007; Riley et al., 2024) devastatingly stark, government responses re-entrenched the displacement and concentration of vulnerability onto specific individuals and communities in order to shore up the notion of the 'body politic' as invulnerable. Explanation for these disparities has tended to end at the foregrounding of 'pre-existing conditions' such as diabetes, or living arrangements such as multiple occupancy, rather than understanding disproportionate mortality as an effect of structural and systemic inequalities (Eaves and Al-Hindi, 2020; Patel et al., 2020).

LGBTQ + communities broadly and trans, non-binary and gender diverse communities in particular, have also been highlighted in research examining disproportionate impacts of the pandemic. Studies have examined the impact of COVID-19 on delays in already-lengthy waiting times to access gender affirming care (van der Miesen et al., 2020), especially for transfeminine and low income trans people (Koehler et al., 2023); disproportionate mental health impacts for LGBTQ + young people (Hawke et al., 2021) and adults (Kidd et al., 2021; Koehler et al., 2023); violence against trans communities (Perez-Brumer and Silva-Santisteban, 2020); primary care avoidance (Tami et al., 2022); and loss of employment and housing (Smout et al., 2023).

When considered collectively, these studies powerfully indicate the ways in which the pandemic has accelerated and intensified existing disparities, as Pieri (2022) argues. In the US, inconsistent collection of sexual and gender identity data acted as a form of structural erasure in public health (Sell and Krims, 2021), while implementation of mobility restrictions in Peru on the basis of binary gender functioned to make trans and gender non-conforming people simultaneously hyper-visible and vulnerable to both interpersonal and state violence (Perez-Brumer and Silva-Santisteban, 2020). Widespread designation of trans healthcare as 'non-essential' justified redeployment of resources and staff away from gender affirming care, in some instances with no communication to those already registered with or waiting to access these services (Eickers, 2020; Pearce et al., 2020). Rather than representing a purely exceptional recourse in a time of crisis, these trends highlight long-standing and deeply rooted understandings of gender affirming care as 'unnecessary' use of national resources (Eickers, 2020).

Scholarly engagements with COVID-19's disproportionate impacts on trans and gender diverse communities highlight the role of what Dean Spade (2015) articulates as administrative violence; uneven distributions of vulnerability to illness, death, homelessness and violence within and across trans communities are connected to the ways in which gendered and sexed difference intersects with

other forms of oppression and produces vulnerabilities that are differentially acute and persistent. The most severe impacts have been felt by those for whom transness intersects with marginalisation along the lines of race, disability, age, poverty, engagement in sex work, migration or refugee status and homelessness (Eickers, 2020; Pearce, 2018).

In concert with this acceleration along identifiable metrics of disadvantage (housing, education, health and healthcare, interpersonal violence), pre-existing trans-antagonistic political and public discourses have intensified and thrived in response to COVID-19. In the UK, transphobic discourse and politics clearly precede the pandemic, but have intensified rapidly during and since the advent of COVID-19 lockdown and restriction measures.[8] This has not been the result of COVID-19 singularly, but the pandemic has functioned in specific ways to drive this escalation, for example as a set of conditions in which hostile and regressive discourses could be magnified online,[9] an opportunistic moment for the driving forward of anti-trans legislative campaigns (Gamberton, 2023) and an affective landscape of fear and anxiety (Van Bavel et al., 2020) in which such discourses exploit a sense of imminent threat.

The displacement of shared vulnerability, achieved through the expulsion of varied 'others' from the body of the nation, draws from and reinforces rhetorical landscapes of war, securitisation and border security that intensify demands for bodies to 'fit' in particular ways within the collective body-as-nation (Neocleous, 2022; see also Beauchamp, 2019).[10] This context can orient us towards a deeper understanding of the intensified framing of queer and trans bodies (including and alongside fat bodies, aging bodies, migrant bodies, racialised bodies and more) as disruptive, dangerous and compromising. In their analysis of racism and nationalism in relation to COVID-19, for instance, Elias, Ben, Mansouri and Paradies (2021: 789) reference the significance of fear in driving a 'sliding back into a primal, survivalist mode of approaching our own existence vis-à-vis racialized and feared Others'. In relation to transness specifically, Thompson (2022: 480) argues that anti-trans feminist discourses 'draw from the affective resonances of the pandemic' in order to shape public and political opinion. Gamberton goes further, arguing that, in a context in which responses to COVID-19 vividly drew upon militarised and securitised imagery conflating individual body and sovereign nation (Neocleous, 2022), transness and trans people were cast 'as subverters of the natural health and order of the body' in service of reaffirming 'the ontological securitisation of the body politic' (Gamberton, 2023: 231).

Clearly, the pandemic has not functioned to diminish the forms of disproportionate vulnerability that attend trans life; existing vulnerabilities have intensified (particularly for those positioned to experience them most acutely) or been exceeded, as political and ideological projects entailing a raft of compounding vulnerabilities have been driven forward (Gamberton, 2023). Trans and non-binary experiences of the pandemic highlight the ways in which COVID-19 amplifies both the universality of human vulnerability and the differential vulnerabilities that are created and sustained for marginalised communities. Understanding this paradox requires appreciating the ways that immunological and contagion discourses have been mobilised to frame minority and non-normative elements within a population as simultaneously a weakness and a threat.

Queer-trans virality and anti-trans immunological discourse

Since the emergence of virology in the late 19th and early 20th centuries (Crawford, 2018), virality[11] has represented a loaded concept informing and informed by political, economic and social-discursive landscapes. Viruses are particularly powerful metaphors for many and varied 'others' in ways that have been deployed to connect the borders, boundaries and permeability of the individual human body with those of the nation (Neocleous, 2022). Iterative historical and contemporary discourses of queer disease and contagion are interconnected with long histories of virality's mobilisation in justifying colonial violence; in *Epidemic Empire*, Raza Kolb (2021: 287) traces

recurrent historical framings of anticolonial resistance and insurgency as epidemics, with human actors 'reconfigured as viral vectors or infectious agents'. Within such logics, constructions of the 'healthy' individual body and the body politic, as they pertain to sexuality and gender, have never been separable from state and colonial power.

Across varied and extensive histories of the casting of sexual and gender difference as social contagion, nation and empire have been implicated in the construction of 'healthy' and pathological sexual and gender difference, illustrating the enmeshment of constructions of ideal gendered personhood with the violent and extractive machinations of coloniality (Lugones, 2010). The invocation of 'degeneracy' in evolutionary scientific framings of homosexuality reflects wider colonial and eugenic projects (Hoad, 2000); anti-miscegenation laws also centred notions of communicable degeneracy and degradation in order to justify the exercise of eugenic control over sexuality, particularly of Black people (Ehlers, 2011). Examining the 21st century shifts to declaring 'war on terror', securitisation and purging the enemy within, Jasbir Puar (2007: 52) describes contagion and virality as the 'suture' whereby racialised threats of terrorist infiltration and invasion have been intertwined with queerness and AIDS as existential threats to society. It should perhaps not be surprising, then, that contemporary anti-trans discourse is rich with such viral imagery; terminology of 'social contagion' (Shrier, 2020), 'rapid onset gender dysphoria' (Littman, 2017) and 'psychic epidemic' (Marchiano, 2017) circulates widely, despite an increasing proliferation of scholarly debunkings (Ashley, 2020; Bauer et al., 2022; Farley and Kennedy, 2020; Hsu, 2022; Literski, 2021; Restar, 2020; Turban et al., 2022).

The concept of social contagion extends a longer tradition of applying epidemiological concepts to non-communicable diseases and, further, to observable behaviours, attitudes and identities, describing the observed spread or transference of affect, attitude, or behaviours from one person to another (Levy and Nail, 1993). Ashley (2020: 784–785) unpacks the logic underpinning narratives of trans contagion, showing that these are grounded in framings of transition as 'offering a quick solution for an underlying psychological distress rooted in mental illness', as resolutions of internalised homophobia, and, for trans masculine people, as 'a flight from womanhood motivated by rigid gender roles and the sexual objectification of cis female bodies'. Anti-trans viral discourses centre and are justified in service of the 'protection' of the national body (often racialised as White), cisgender women and children and young people, particularly girls and young women. Young people are the subject of the most explicit viral discourse (due, in part, to their position as the 'future of the nation' – see Hernandez Aguilar, 2023).

Various imagined structures of 'contagion' are proposed in trans-antagonistic or trans-sceptical literatures. Shrier's (2020) account of social contagion emphasises mimicry, with the Internet representing a conduit of infection via trans influencers. Marchiano's (2017) 'psychic epidemic' hypothesis foregrounds peer contagion, using the sinister term 'clusters' to describe friendships between trans or gender diverse young people. 'Rapid-onset gender dysphoria', as articulated by Littman, represents a pseudo-scientific bridge spanning these accounts and imbibing them with the legitimacy of clinical psychological language (even as ROGD has not been medically recognised as an existing 'condition'; Ashley, 2020).

Young people are constructed in such contagion accounts as a uniform entity without agency or individuation; a body through which transness spreads like disease if given a point of access. 'Openings' into this body – such as in schooling, when accessing healthcare and online – are refigured as sites of potential infection. The Internet figures prominently as a dangerous conduit for contagious influence; Littman (2017: 2) cites 'binge-watching' of YouTube videos and 'excessive use of Tumblr' as harbingers of imminent dysphoria. Schools, away from the direct oversight of parents and carers, feature as places where 'outbreak clusters' might incubate, potentially spurred by affirming school policies and practices. Implicitly, the categories of 'children and young people' are constructed as monolithically 'healthy' when free of gender variance (Gill-Peterson, 2018).

This construction itself can be understood in the context of histories of Euroamerican codification (or 'invention') of sexuality and gender identity into fixed and definable *trait* categories, as a result of 19th and 20th century Western sexological scientific, medical and psychiatric inquiry (Foucault, 1978; Hartman, 2021; Schuller, 2017; Snorton, 2017). Efforts to establish the sexually 'normal' and 'healthy' subject (Schaffner, 2012) meant that the construction of sexual and gendered 'others' (among many 'others') as pathological was inseparable from constructions of 'health' across individual, social and national levels. In 19th-century sexological contexts, physiology was assessed as material evidence of deformity and degeneracy (in ways that explicitly drew upon and reinforced scientific racism: Hoad, 2000; McWhorter, 2010), and mobilised in support of a framing of 'aberrant' sexualities and genders as a corrosive threat to the 'physical vigor and the moral cleanliness of the social body' (Foucault, 1978: 54).

While a vocabulary of contagion has gained prominence in the 21st century Anglophone transphobic discourse, it is striking that *The Transsexual Empire* (Raymond, 1980) – arguably the seminal text of codified feminist transphobia – invokes empire front and centre in its title. While the term 'empire' here purportedly refers to the medical establishment, the more enduring invocation articulated in Raymond's work has been that of gender affirming healthcare as functioning to enable trans feminine people to 'infiltrate' and 'colonise' womanhood (Hsu, 2013). The strapline to the first edition of Abigail Shrier's book *Irreversible Damage* – 'the transgender craze *seducing our daughters*'[12] (emphasis added) – represents an explicit intertwining of immunological and ethnonationalist rhetoric, invoking as it does an imagined 'us' and an imagined population of daughters. The leading astray of 'our' imagined daughters represents a crisis of proprietorship in relation to the heteronormative capitalist family unit, and also a reproductive crisis in relation to the future of the nation.[13] The source of this crisis – the 'transgender craze' – is considered both contagious and seductive, rendered both predator and pathogen in a melding of anthropomorphic viral and dehumanising colonial imaginaries (which, arguably, were already one and the same: Raza Kolb, 2021). Where trans feminine people are figured as calculating infiltrators, trans masculine people in Shrier's account are naïve dupes and defectors, 'seduced' away from the family, the nation and reproductive viability.

Considering the colonial histories that underpin framings of 'transness as viral contagion' also illuminates antisemitic tropes and rhetoric. Raymond's (1980) description of trans men as a 'final solution' to the problem of women is cited by Lorber and Greenesmith (2021) as an early indicator of the extent to which anti-trans discourse is imbricated with antisemitic tropes and conspiracy theories. Noting examples of high profile pro-trans Jewish campaigners and funders being singled out, Lorber and Greenesmith highlight the implication (both implicit and, increasingly, explicit) of a shadowy cabal of elites advancing 'gender ideology' in service of sinister ulterior motives (Miles, 2022), a long-standing feature of antisemitic conspiracy theories (Byford, 2021). Anti-trans discourse has also been connected with 'white replacement' conspiracies (Hernandez Aguilar, 2023; Lorber and Greenesmith, 2021), and the evoking of antisemitic blood libel tropes in media discourse about children and young people (Lorber and Greenesmith, 2021). Reflecting these ideological connections, financial and political links between groups advancing anti-trans agendas and far-right groups advancing explicitly antisemitic politics are increasingly evident (Miles, 2022). While the paradoxical framing of othered populations as simultaneously weak *and* threatening is ubiquitous in xenophobic discourses, the specific combination of imperial ambition with an insidious threat of contagion is a classic anti-semitic trope now applied to the discourse that unites these threats in an imagined trans 'agenda'.

Thompson (2022) comments on these tactics, applying Farris's (2017) concept of femonationalism to British transphobia, to argue that anti-trans discourse, in aligning transness with viral threat, positions the (implicitly white) nation's women and children as in need of defence. Eugenics represents the link connecting the pathologisation of gender and sexuality diversity,

constructions of the normative nuclear family, and the future, 'health' and security of the nation. While language of pathology and disease in relation to the presence of transness and gender diversity in public life was present prior to COVID-19, this discourse and associated campaigns for the removal of legislative and policy protections for trans people have intensified rapidly in the period following the end of official restrictions in the UK and US. These shifts are not only symptoms of right-wing backlash and rising populism, but crucial drivers of that trend, and are increasingly explicit in seeking outright eradication as their ultimate objective.[14] Gamberton's (2023) account of the mechanisms whereby the vulnerabilities issuing forth from COVID-19 raised the stakes of trans precarity and cisgender fragility, illustrates with painful clarity the ways in which efforts to purge transness from the body politic can be understood as a deformed and deforming promise of psychological and physical 'health', safety and security in the face of overwhelming uncertainty, packaged as a 'return' to a 'natural' sex/gender order.

Thinking with the virus ('transing' the virus?)

By examining the ways in which COVID-19's paradoxical vulnerabilities can be used to think through contemporary anti-trans immunological discourse, we aim to elucidate the extent to which structural investment in and insistence on 'heterogender' (Ingraham, 1994) is inseparable from efforts to maintain human particularity as apart and distinct from 'nature' (Cohen, 2011). In other words, a trans ecological approach to the virus points both to the entanglement of human-virus relations, and to the entanglement of anti-trans immunological discourses with an imagined 'natural' hetero-reproductive order. However, as Searle and Turnbull (2020: 294) emphasise, '[u]nderstanding COVID-19 as a naturalcultural entanglement must not leave actionable politics at the wayside'. Povinelli (2021: ix; see also Giraud, 2019) puts this more starkly: 'claims that existence is entangled […] have no political content in and of themselves but can only derive their politics from the ongoing effects of the ancestral catastrophe of colonialism and slavery'. It is therefore necessary to think through what forms of violent and oppressive politics are produced or mobilised in different ecological framings of the virus, as well as to understand where and how an ecological paradigm can be conducive to a liberatory politics of knowledge production.

This impetus, in response to long histories of pathologisation and the mobilisation of viral and immunological discourses as tools of oppression, has led queer and trans studies scholars to rethink toxicity (Chen, 2011, 2015), infection (Patton, 1985; Sontag, 1988) and virality (Balogh, 2015; Thompson, 2022) in terms that refuse, or at least unsettle, the normative frameworks usually applied to these forms of contagion. One such response that bears on the question of how to generate actionable politics from an understanding of COVID-19 as natural-cultural entanglement is Matt Thompson's call to embody rather than refuse a positioning of transness as viral threat. Thompson (2022: 480) positions the recuperation of virality as a necessary dimension of revolutionary trans politics. Highlighting the ways in which anti-trans organisers have drawn on the 'affective resonances' of the pandemic, Thompson (2022: 480; 484) reappropriates the figure *issuing from* this discourse – one constructed in terms of a virality that is defined by threat and destruction – to argue for embracing threat as 'an aggressive politics that carves out a space for trans* politics and survival'. Concluding these reflections, Thompson proposes reclamation and embodiment of 'the virus' as endemic threat, arguing that 'threat is foundational to a revolutionary politics' and that 'trans* scholarship might instead embrace and embody the viral threat it is already figured to be'.

While Thompson questions the benefits of refusing a positionality of viral threat and critiques the assimilationist effects that can issue from a turn away from confrontational politics, they do not engage with the logics whereby virality is figured exclusively or primarily *as* threat in the first place. Their one-dimensional embrace of the viral contrasts sharply with Povinelli's (2016,

2021) 'agnostic' figuration of the virus – alongside the desert and the animist – as one of three figures with which to think through the distinctions and divisions between life and non-life in late settler capitalism.[15] Here the virus emerges as simultaneously a site of radically disruptive or even liberatory potential, *and* a condition of susceptibility to harm within an order attached to the differentiation of life and non-life. While it may seem to offer a 'radical exit' from governance through that distinction, 'to be the Virus is to be subject to intense abjection and attacks, and to live in the vicinity of the Virus is to dwell in an existential crisis' (Povinelli, 2016).

Viral entanglement is not simply a figure for either revolutionary alterity or ecological connectedness, but a critical site of 'ontological securitisation' (Gamberton, 2023) at the boundary of life and non-life, human and non-human. The rhetorical uses to which viruses have been put hinge upon scalar epidemic narratives that collapse space and time in ways that destabilise foundational distinctions and systems of categorisation at multiple levels. Specifically the viral capacity to destabilise sovereignty relates both to national sovereignty and borders (as articulated by Puar, 2007) and also, for Cohen (2011), to notions of individual liberal personhood as rooted in 'ownership' of and personal responsibility for one's own body. Dominant viral narratives, Cohen (2011: 15–16) contends, respond to the destabilising ruptures posed by viral epidemic by re-entrenching the separation of humans from 'nature':

> The politics of viral containment relentlessly plays upon the contingency of the human "we." It conceptually and materially confounds our understanding both of how individuals constitute our collectives and of how we exclude other collectivities that might not belong to them – whether these "others" are other individuals, other populations, other humans, other species, or other non-vital entities, such as viruses.

Cohen (2011: 27) concludes that ongoing investment in the 'natural fact' of human particularity has the consequence of orienting 'us (humans)' away from 'the complex scalar connections through which we (living organisms) relentlessly weave ourselves into the world' and 'the ways our political and economic values deeply inform – and often deform – our vital interests'.

Since, as we have shown, there are many who do not 'live in the vicinity of the Virus' (Povinelli, 2016) by choice, it is not sufficient to reclaim virality as an heroic end game for trans theoretical and actionable engagement. Considering broader theoretical perspectives on virality and 'the virus' may signal alternative possible orientations which, while not disavowing irreverent, confrontational and radical traditions and objectives, do not reduce trans scholarship, activism and liberation (or virality) to a singular or reductively literal form of threat (one wherein the liberatory potential of such a strategy is overemphasised). Mel Chen (2011), in their analysis of the racialised, disabled and queer aspects of toxicity, has shown that it is possible to resist framing toxicity as queer utopia while still affirming the 'queer productivity' of toxins and toxicants (see also Krupar, 2012; Shotwell, 2016; Straube, 2020; Boast, 2022). This constitutes a move away from 'figuring' the virus or virality as a fixed mode of being, to foreground instead the power of relationships and processes of adaptation, coalitionality, uncertainty, evasion and change which viral entanglement entails. Thus Chen (2011: 281) highlights 'the desires, the loves, the rehabilitations, the affections, the assets' that the effects of toxicity can produce out of necessity. These modes of relation, expressed in the building of networks and practices of care and accessibility as a response to the lived chronic impacts of toxic exposure, suggest a form of trans 'viral' practice and politics that cannot be reduced to a singular mode of oppositional resistance. Equally importantly, it offers a model distinct from any endeavour that seeks (or unintentionally tends) to establish transness as a fixed entity or field.

The alternative that we offer here is to think with virality in relation to the effects of transness in the collective milieu of lived sex and gender (S Brice, 2020) and as a means of throwing into relief the immunological logics underpinning anti-trans discourse. Investment in the 'natural fact' of binary sex

and gender, to repurpose Cohen, directs collective struggle away from the ways in which biological essentialism 'informs and deforms' lived sex and gender. Just as the narrative detachment Cohen articulates obfuscates from view the political and economic forces that result in the most devastating escalations and effects of viral epidemic, critical examination of anti-trans immunological discourses illuminates patterns of manufactured panic that obfuscate those forces producing and sustaining gendered patterns of violence, oppression and harm (Gamberton, 2023; Hines, 2020).

If the viral, following Cohen, is that which is threatening precisely because it undoes the boundaries of life and the living, and indeed the boundaries of the self-same *as* political body, this is also its promise. Articulating that promise need not end at a revalorisation of viral threat in the sense that Thompson proposes – embodying trans contagion as a kind of gestural 'fuck you' to gender-conservative normativities. Superficially satisfying as that oppositional move may be, we argue that embracing the viral offers a more expansive set of analytical sensibilities for considering both the messiness of that burden which immunological suspicions place upon trans lives and the messiness through which, like viruses, trans lives undo the parameters of political subjecthood.

Viral ecologies thus emerge as a means of 'thinking with the virus' to consider transness not simply as a threat but as a *demand* made on the collective milieu; a demand to reconfigure the spacing of gendered subjectivity along collective and distributed, rather than individual and fixated, lines (Berlin and Brice, 2022). This represents a different mode of 'embodying the viral'; one that more adequately addresses that paradox of viral containment which Cohen identifies. Indeed, thinking ecologically with the virus may represent a means with which to decentre the tensions that arise in identifying or seeking to identify with virality. It is not the virus as a figure or entity that is embodied *per se*; rather, viral ecologies orient us towards a set of embodied relations and effects. Such an approach recognises the inseparability of 'viruses' from human life (and, indeed, from evolution or existence as we know it) and in so doing recognises viral crises as unfolding along paths carved out by political and economic vested interest and power. Viral ecologies are after all fundamentally concerned with how sets of relationships can be understood to produce particular outcomes.

Thinking ecologically with the virus as a means of engaging with paradoxical trans vulnerabilities can also produce a clearer orientation towards the stakes entailed by different modes of ecological thinking, as they pertain both to multispecies interconnectedness and to human sex and gender orders. As we have noted, examination of the intertwined colonial histories of ecology and epidemiology highlight a shared investment in 'natural order' as characterised by idealised stasis, with *any* change or disturbance positioned as a threat. The construction, in anti-trans viral and immunological discourse, of the body politic and of young people in particular as an undifferentiated mass whose ideal and 'natural' state is one in which gender variance is absent (Gill-Peterson, 2018) relies on a similar fantasy of stasis, containment and purity. Bracketing queerness and transness away from (and in oppositional conflict with) any and all 'norms', risks reifying precisely such a notion of 'pure' positionalities (Shotwell, 2016).

The deeply entrenched militarisation of responses to viral infection belies a paradoxical constitutive vulnerability (Ferri, 2018). Marshalling defences to eradicate contagion at the level of the individual and national body, ostensibly in service of establishing invulnerability, confirms the fundamental fact of vulnerability itself, since 'the very nature of contagion renders the body and its border penetrable – vulnerable to trespass – or, to put it differently, inherently permeable' (Ferri, 2018: 4). In this sense, mobilisations of immunological discourse in service of anti-trans political and social agendas belie a similar confirmation of the constitutive instability of sex and gender categories: if binary categorisation and boundaries were not in fact inherently unfixed, they would not require vigilant policing and legislative intervention. Implicit in recourse to militarised and securitised discourses of virality is a recognition of sex and gender not as individual characteristics but as 'a problem that is inherent to both the individual and the collective milieu' (S Brice, 2020).

Efforts to block and close 'contact zones' and remove transness from public space (in a set of coordinated discursive tactics and material actions described by Balogh (2015) as 'queer quarantine') zero in precisely on spaces 'between' as those in which lived sex and gender 'happen'. When virality is framed as a threat to the nation and the bounded self, the other side of the coin to which Ferri (2018) directs us is an implicit confirmation, contained within this framing, of the emphatic interconnectedness of liberated trans becomings with a broader politics that seeks to undermine and collapse deforming narratives and milieus. This politics is not always or necessarily purposive; an oppositional stance. Trans becomings, like viruses, simply *are*, and by virtue of their becoming they are both constitutive of, and disruptive to, ordered possibilities of sexed and gendered existence through which all subject bodies must move.

Our proposal for 'transing' the virus thus shares with 'queering' its commitment to making strange existing orders of meaning and identity, but adds to queer's aesthetic of refusal a note of messy ambivalence; a lingering concern with how such orders operate and function materially that isn't satisfied by simple oppositional framings. This approach is grounded in the ways trans experience forces a deeper reckoning with the relationship between embodiment and figuration – a relationship which queer thought has sometimes sought to diminish or transcend. Thinking with the virus, as opposed to seeking to identify with or recuperate it as a figure, signals alternative possibilities for a reclamation of that proximity to virality into which transness and other marginalised subjectivities are forced. Such possibilities, we contend, include maintaining focus on identifying, organising around and seeking to intervene on uneven patterns of impact, centring those positioned to experience impacts most acutely and grounding trans politics in the forms of care and aid that can emerge as strategies for survival in response to the intertwining impacts of being constructed as viral threat and, consequently, being more vulnerable to the impacts of viral pandemic.

Conclusion

Notwithstanding the colonial heritage outlined above, ecology has been crucial in the history of Western thought in that it introduced to dominant science[16] a paradigm for considering the interrelatedness of all life, and for including in that consideration not only individual organisms or species but also their environments. More recently, ecology has offered a way of conceptualising social, material, cultural, political, ideational and biological phenomena transversally; that is, as entangled and relational processes that move through and across, rather than simply between, seemingly bounded bodies and entities.

It is true that ecology has tended to reproduce a conceptual model in which relationships take place between already-given, bounded entities (that is, a model in which species and organisms are ontologically prior to their relationships). However, scientists are increasingly calling into question the boundedness and stability of these historical building blocks, as well as the teleological dimension of theories of natural balance and equilibrium, thereby shifting the emphasis towards an understanding of relationality as constitutive rather than secondary (Gilbert et al., 2012; Hey, 2001; Oro and Martínez-Abraín, 2023; Whittaker, 2000). Critical ecological perspectives have also been significant to recent developments in liberatory scholarship, as evidenced by the growth of 'Queer' (Giffney and Hird, 2008; Mortimer-Sandilands and Erickson, 2010), 'Trans' (Hazard, 2022; Straube, 2020), 'Black' (King, 2018; Roane, 2022), 'Latinx/Chicanx' (Lara-Valencia and García-Pérez, 2020; Pulido and De Lara, 2018), 'Disabled/crip' (Clare, 2017; Ray et al., 2017), 'Anticolonial' (Madera, 2023) and 'Abolition' (Heynen, 2021; Heynen and Ybarra, 2021) Ecologies, to name just a few of these overlapping strands.

Ecology is crucial to this work for at least four reasons: First, it supports an understanding of environmental justice that does not separate out the social, built and natural dimensions of 'environment' (Lara-Valencia and García-Pérez, 2020). Second, it highlights the modes of exclusion through which

various marginalised people and communities have been denied access to, or connection with, non-human 'nature' (Draus et al., 2021). Third, it invites a consideration of the parallels between wildness, ungovernability, fugitivity and resistance in lives and ways of living that have persisted in the marginal spaces of empire and capitalism (Clare, 2017; Hosbey and Roane, 2021; Snorton, 2017). Fourth, it unsettles established social orders of belonging and entitlement in which marginalised people and communities have been constructed as either unnatural or too close to nature – in both cases counting as less-than-fully-human on the basis of that in/proximity (McWhorter, 2010).

In short, critical and liberatory ecologies aim to rethink the work that nature concepts do in naturalising forms of discrimination, dispossession and violence, as well as the possibilities offered by alternative formulations. In this article, we have argued that an ecological perspective on the virus helps bring into focus the relationship between pandemic vulnerabilities and immunological discourses which construct certain elements of the population as disposable, undesirable, or threatening. Discourses of trans contagion hinge on a fear of disruption to the boundedness and stability of political categories and orders of belonging. They also, however, point to the possibility inherent in such disruption: that of conceiving the world in terms of mutual entanglement and reciprocal responsibility. Thinking (trans)ecologically with the virus may represent a means with which to move away from efforts to differentiate the radical and liberatory potential of virality from its abjection. Instead, through insistently staying with the ecological enmeshment and effects of virality, we propose thinking with the virus as a mode of refusing certainty and stasis, attuning and orienting to (without romanticising) lived impacts in relation to a wider milieu and bridging the efforts of political redress that emerge in response to those impacts with diverse strategies for resistance to the conditions that produce them.

Thinking ecologically proceeds from the recognition that social phenomena (such as transphobia, pandemic governance, or ontological securitisation) take shape as part of complex sets of material relations that are not neatly divisible between human and non-human. It also requires thinking critically about the ecological models and disciplinary frameworks through which socio-ecological phenomena are understood. Thinking ecologically with the virus foregrounds the part that nature concepts play, alongside material conditions of mutual but unequal vulnerability, in delineating social categories of life and non-life, as well as the naturalisation of associated orders of belonging and unbelonging. Ethically and politically, the figure of the virus is both messy and agnostic; viral strategies of resistance must take this into account if they are to avoid reproducing investments in fixed ways of being and of imagining otherwise. In the formulation that we have presented here, neither virality nor transness inherently constitute either radical threat or abject existential crisis. Nor do they represent any figure we might separate out from a distinct field of actors. Rather, they are vectors of demand and change that must be understood as inseparable from their effects across human and non-human ecologies.

Highlights

- Thinking ecologically with the COVID-19 virus presents a series of ethical and political challenges for critical environmental geography
- Ecological and epidemiological thought share a closely linked genealogy, situated within the colonial imaginaries that produced them
- Parallels between popular and political responses to COVID-19 and to the rise of trans visibility reveal underlying immunological frameworks
- Applying immunological reasoning to social and environmental phenomena supports forms of exclusion and injustice
- Queer, trans, Black, Latinx, Chicanx, Crip and other 'ecologies of difference' offer a liberatory framework for critical environmental geography.

Acknowledgements

We would like to thank Lou Aphramor, Jack Gieseking, Jessi Lehman and Helen Wilson as well as two anonymous reviewers for their comments on drafts of this article. We would also like to thank Rachael Eastham and Siobhan Reilly for generative discussion of the ideas explored.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: The research was supported by a British Academy Postdoctoral Fellowship (PF21\210123).

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Notes

1. 'Trans' refers here broadly to a range of identities and presentations that do not follow the prescribed correlation of assigned sex and binary gender. Without collapsing the diversity of gender variance into one homogenous category, trans in this article includes (but is not limited to, and in some cases only partially overlaps with) categories such as transgender, transsexual, non-binary, *travestí*, two-spirit, intersex, and gender-nonconforming.
2. The word viral is employed here in its literal and metaphorical senses, to mean both narratives about viruses or virality, and narratives, which spread 'virally' in digital spaces. The conjunction of these two meanings is not an accident; see discussion in Cifor and McKinney (2020) on the role of viral metaphors in the conjoined history of HIV and digital media.
3. That many of these viral examples were geographically and/or temporally misattributed and did not represent novel pandemic phenomena underscores the broader observation that pandemic exceptionalism is an expression of human exceptionalism and obscures the pervasive and everyday nature of human–non-human entanglement.
4. Western medicine also appropriated African and indigenous knowledge about the spread and management of disease. Significant evidence suggests the practice of inoculation originated with West African medicine; Europeans adopted the technique and practiced mass involuntary inoculation of enslaved and poor people in an attempt to control epidemics (Mitchell, 2022).
5. It is interesting, from a disciplinary perspective, that geographers such as Humboldt played a significant part in the establishment of ecology: George Perkins Marsh later explicitly advocated to incorporate within geography a 'study of plants and animals in relation to their surroundings' (Egerton, 1977).
6. This is also a shift to bio-political (Foucault, 2003) and perhaps geontopolitical (Povinelli, 2016) forms of governance.
7. For commentary on how architectures of containment rewrite vulnerability as a threat to social order see Mulvin and McKinney (2023).
8. Examples of such intensification in 2023 alone include: a record number of anti-LGBTQ+ bills proposed in the US, particularly targeting trans youth (Neus, 2023); gender recognition reform legislation which passed in Scotland but was blocked by Westminster (Sim, 2023); and ongoing uncertainty as to whether UK government will require schools to 'out' trans and gender diverse young people to their parents or carers without their consent (Fox, 2023).
9. The magnified impact, for example, of author J.K. Rowling's lengthy anti-trans public essay, published to her website in June 2020 at a point early in the pandemic when many were spending much more time online due to lockdown measures. Rowling's public commentary has been highly influential in the UK and her essay incited extensive media coverage framing trans women and trans feminine people as predatory and threatening (Gwenffrewi, 2022).
10. The pernicious impact of these ways of thinking can be discerned in political application of concepts such as 'herd immunity'; a strategy which, if pursued, would effectively mean the acceptance of mass death as a kind of collateral damage (Aschwanden, 2020). The concept of ecological fallacy – known to geographers

from statistical analysis – names the error of conflating group and individual level data. A moralising application of this fallacy gives rise to the idea that 'survival' can meaningfully be measured at the scale of populations (or nation-states, or indeed species) rather than at the scale of individuals. Of course, a more basic fallacy was the notion that herd immunity could be acquired through population exposure rather than vaccination.

11. Virality (the condition of being viral, applied metaphorically to rapidly popularised digital content, especially via social media) should not be confused with virility (the masculinised quality of having strength, especially when associated with sex and/or reproduction) – though of course some forms of transphobic imagination appear to conflate the two.
12. In the 2021 UK edition of Shrier's book, published by Swift Press, the strapline has been changed to 'Teenage Girls and the Transgender Craze'.
13. The visual representation on the book's cover suggests, also, a racial dimension to this crisis of proprietorship: a circular hole is cut out of the doll-like figure of a white girl, so that a literal void replaces the girl's reproductive organs, echoing anxieties of 'white replacement'.
14. See Mannion and Speed (2023) on the rise of right-wing populism in the Global North and its association with rising inequality as well as cultural backlash.
15. Although the virus is but one part of a broader analytic system which we do not fully enlist in this article, Povinelli offers insightful reflections on the figure of the virus and the viral that are pertinent to our argument.
16. Liboiron (2021) uses the term 'dominant science' when discussing the Western academic canon, both to foreground the power relations that have informed its production and dissemination, and to acknowledge other forms of scientific knowledge or practice which have been excluded from it, including indigenous and racialised sciences as well as Western sciences outside the mainstream.

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