

History, disease, and ecology after COVID-19: multispecies entanglements in the planetary age¹

História, doenças e ecologia pós-COVID-19: agenciamentos multiespécies na era planetária

Histoire, maladie et écologie après la COVID-19 : intrication multispecifique à l'ère planétaire

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Abstract

This work explores how the recent COVID-19 pandemic expresses the overlapping processes that characterize the Anthropocene. The objective is to analyze how the pandemic and this new geological epoch challenge the writing of the history of diseases. The unveiling of the planetary condition by both phenomena highlights the need for historical frameworks more attentive to the multispecies entanglements of humans within the planet's life support system. The study advocates for the adoption of multispecies studies as an appropriate approach to understand health and disease within these entanglements. Finally, the article briefly assesses the position of the history of tropical medicine in addressing pertinent issues arising from the history of diseases amidst the transformations of the Earth System understood by the concept of the Anthropocene.

Keywords: COVID-19, Anthropocene, planetary regime, planetary health, multispecies studies, history of tropical medicine, history of disease.

Resumo

Este trabalho explora como a recente pandemia de COVID-19 expressa os processos sobrepostos que caracterizam o Antropoceno. O objetivo é analisar como a pandemia e esta nova época geológica desafiam a escrita da história das doenças. A revelação da condição planetária por ambos os fenômenos destaca a necessidade de enquadramentos históricos mais atentos aos entrelaçamentos multiespécies dos seres humanos dentro do sistema de suporte vital do planeta. O estudo defende a adoção dos estudos multiespécies

como uma abordagem adequada para compreender a saúde e a doença dentro desses entrelaçamentos. Por fim, o artigo avalia brevemente a posição da história da medicina tropical para abordar questões pertinentes decorrentes da história das doenças em meio às transformações do Sistema Terrestre compreendidas pelo conceito de Antropoceno.

Palavras-chave: COVID-19, Ecologia, Antropoceno, regime planetário, saúde planetária, estudos multiespécies, história da medicina tropical, história das doenças.

Résumé

Ce travail explore comment la récente pandémie de COVID-19 exprime les processus superposés qui caractérisent l'Anthropocène. L'objectif est d'analyser comment la pandémie et cette nouvelle époque géologique remettent en question l'écriture de l'histoire des maladies. La révélation de la condition planétaire par ces deux phénomènes souligne la nécessité de cadres historiques plus attentifs aux entrelacements multi-espèces des êtres humains au sein du système de soutien vital de la planète. L'étude soutient l'adoption des études multi-espèces comme une approche appropriée pour comprendre la santé et la maladie au sein de ces entrelacements. Enfin, l'article évalue brièvement la position de l'histoire de la médecine tropicale pour aborder les questions pertinentes découlant de l'histoire des maladies au milieu des transformations du Système Terrestre comprises par le concept d'Anthropocène.

Mots-clés: COVID-19, Écologie, Anthropocène, Régime planétaire, Santé planétaire, Études multi-espèces, Histoire de la médecine tropicale, Histoire des maladies.

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Introduction

When the COVID-19 pandemic broke out, historians promptly responded to the health emergency, offering reflections generated in the heat of the moment to address the overwhelming demand from a society perplexed by those unprecedented circumstances [1,2]. Historians of medicine, diseases, and public health were particularly urged to share their insights based on their expertise in studying epidemics in past societies, the experiences of those affected, and the similarities and differences between the present and past health crises [3,4].

Environmental historians also published their reflections on the connection of the COVID-19 outbreak with ecological changes in different scales and timeframes [5]. They consider that COVID-19 “provides an almost perfect illustration of the relevance of the major questions, approaches, and concepts that have dominated debates in environmental history over the past decade” [6].

This essay revolves around this wave of discourses on the pandemic. I focus on the understanding of COVID-19 as part of a multilayered crisis intertwined with biodiversity loss and climate change crises. This overlapping crisis is one of the main reasons several authors have referred to COVID-19 as the Anthropocene disease [7,8]. Drawing on the literature on the Anthropocene in the humanities, I first explore why the pandemic has been apprehended as an Anthropocene disease. These introductory aspect sets the stage for the central part of this essay, which addresses how this “encounter with the planet” that characterizes the Anthropocene potentially affects historical writing, specifically the history of diseases. I will conclude with some concise remarks about the place of the history of tropical medicine in the outlined debate.

The “Anthropocene Disease” and the emergence of the symbiotic planet

The alleged zoonotic origin of the COVID-19 agent has prompted connections between the emergence of the new pandemic and ecological transformations resulting from socioeconomic processes [9]

The spillover of the new virus has been linked to habitat disintegration, the increasing demand for animal protein due to population growth, illegal wildlife trade, and changes in land use driven by agriculture and livestock expansion into forest areas. Other activities such as logging, mining, and urban growth have also been

identified as factors conducive to the emergence of new human diseases. The biodiversity crisis triggered by intensified anthropic actions on ecosystems has frequently been cited as an underlying factor in the emergence of zoonotic pandemics like COVID-19 [5]. The pandemic has also been linked to climate change, with comparisons drawn between the two “crises.” Some have viewed COVID-19 as an “accelerated version” of climate change, which has urged more immediate responses due to its dramatic impact [7].

The connection with the extensive and diverse array of changes occurring in Earth System processes due to human activities has led many authors to characterize Covid-19 as the Anthropocene disease [7, 8, 10].

In this sense, the pandemic manifests an extensive and diverse array of changes occurring in Earth System processes due to human activities. Rather than an extraordinary episode, the coronavirus pandemic has been viewed as a consequence of the accelerated destabilization of ecosystems driven by global capitalism [11]. Thus, COVID-19 figures as part of a sequence of zoonotic pandemics that have become increasingly frequent in the last decades but have also been considered a harbinger of many upcoming pandemics due to the inherent ecological instability characterizing the Anthropocene [12].

COVID-19 and the Anthropocene are also intertwined by establishing a peculiar sense of historical time, which Dipesh Chakrabarty refers to as “chronopolitics” in a recent article [13]. For Chakrabarty, the Anthropocene is when the planet emerges as part of the horizon of human concerns and philosophical categorization. It reveals our integration into the planet’s deep geobiological history and historical trajectory. Chakrabarty argues that the pandemic reminds us of the deep geobiological histories of life and the planet, highlighting our embeddedness in “the ocean of microbes that is both inside and outside our bodies, by late modern, urban, post-antibiotic persons” [13]. In this sense, the pandemic is a planetary phenomenon that underscores that we are a minor part of the web of life amidst a predominant microbial world, which has played a far more significant role in maintaining life than we ever have.

The planetary perspective and the idea of viruses as symbiotic partners draw from theories of symbiogenesis, coevolution, and concepts like holobiont and endosymbiosis that have revolutionized medicine, ecology, and evolutionary biology [14, 15]. Since the 2000s, there has been a “microbial turn,” generating immense

interest in the microbial world and bringing attention to ecologists. At the same time, microbiologists have expanded their investigation scales. Paxson and Helmreich [15] claim that this “microbial turn” marks the advent of a newly ascendant model of ‘nature,’ one swarming with organismic operations unfolding at scales below everyday human perception, simultaneously independent of, entangled with, enabling, and sometimes unwinding human, animal, plant, and fungal biological identity and community.

According to D’Abramo and Neumeyer [14 (29)], the understanding of symbiogenesis subverts traditional conceptual structures. In biology, it challenges the boundaries of organisms, while in politics, it challenges identity projects based on the erasure of biodiversity by highlighting parasitism as a foundational dynamic in community formation. More recently, the humanities have also embraced these changes, recognizing that comprehending humans as multispecies assemblages alters how we historically frame our species [16]. One of the most immediate and clear responses to these understandings in the humanities is the proposal of multispecies studies. History has been slower and more cautious in responding and adopting perspectives like the multispecies approach compared with anthropology and literary studies. Let us now examine how the writing of the history of diseases can be positioned before these challenges of the “Pandemicene”, the term coined by Ed Yong to describe this new epoch of permanent health risks arising from human-induced ecological changes [12].

The ecological and multispecies approach in the history of diseases

In their reflections on COVID-19, historians repeatedly claim that the pandemic invites an integrated perspective that historically addresses disease outbreaks within their ecological contexts [5, 6, 17]. Some reproach the excessive focus on microbial causation and biomedical weapons for tackling the disease, a concern not unfamiliar among historians [17]. Almost 20 years ago, Warwick Anderson [18] warned: “Historians generally have neglected ecological traditions in biomedical science. Like most scientists and physicians they study, historians have instead emphasized the development of simplified laboratory models for complex pathophysiological mechanisms during the twentieth century”.

Despite advances in historical writing regarding health, disease, and ecology, environmental and medical histo-

ries remain on parallel paths. Covid-19 reinforced the necessity of a close dialogue between the two fields. Historical analysis of health and disease in the planetary regime also requires a more decisive embrace of interspecies perspectives, as advocated by multispecies ethnography. This requirement comes from the acknowledgment of humans belonging to a more profound geobiological history and part of multispecies assemblages involving the microbial world. Such an approach can help, for instance, to challenge “human exceptionalism” in concrete historical inquiries, something far easier said than done [19]. According to Domanska [19], environmental and animal history are two subfields of history that apply a post-anthropocentric approach. We can consider that the history of diseases is particularly well-positioned to also employ this approach in its inquiries.

In a foundational text on the theme, Eben Kirksey and Stefan Helmreich [20] define multispecies ethnography as a perspective that “focuses on how the livelihoods of a multitude of organisms shape and are shaped by political, economic, and cultural forces,” including the human species. Anthropological analysis prevails in the area, but a historical perspective is present in how the framework is conceived. One of its leading representatives, the ethnographer Anna Tsing, defines multispecies studies as “human histories within a multispecies field of histories.” [Tsing quoted in 21].

Privileging the landscapes as a unity of analysis, Tsing comprehends them as “multispecies gatherings in the making,” showing, according to Tsing, how life forms and multispecies assemblages “come together to negotiate collaborative survival – who lives and who dies, who stays and who goes” [Tsing quoted in 21].

Domanska argues [19] that a “multispecies knowledge of the past” requires a change in the understanding of time, space, change, rationality, and causality in historical epistemology.

Multispecies perspectives emphasize plurality, multiplying differences, and modes of attention. It privileges the heterogeneity of ontologies, temporalities, world-makings, and ways of knowing. Embracing more relational approaches implies that past and present configurations are co-constituted dynamically by multiple organisms and ways of being. As Emily O’Gorman and Andrea Gainor [22] claim, this relationality signifies that “human meanings and understandings of the world are inseparable from the set of relationships from which they arise.” O’Gorman and Gainor understands co-constitution fundamentally as historical processes.

Diseases are inherently interspecies events arising from intimate contact between at least two organisms in multispecies landscapes. Tsing considers them perfect examples of “feral proliferations,” – consequences mostly unanticipated of destructive entanglements in multispecies landscapes resulting from anthropogenic disturbances. Frequently, diseases break out as effects of “modular simplifications,” with plantation systems being the best illustration, representing attempts to order and simplify heterogeneous connections [23].

The multispecies framework is conducive to understanding the entanglements that result in the emergence of zoonotic diseases. As one of such diseases, COVID-19 highlighted the relevance of human and nonhuman interactions in the emergence of new pathologies, since we share spaces and microbiomes with nonhuman animals. When we modify landscapes and animals’ living conditions, unintended interactions can arise or multiply. For instance, transforming animals’ lives through breeding influences their biological futures and genetic makeup. Approximately 70% of diseases that have emerged in the last few decades have zoonotic origins.

According to Heggie [24], “even the trend toward ‘One Health’ in international health campaigns and resulting funding interest has not resulted in the routine inclusion of animal health and non-human actors in most histories of medicine.” She considers that the history of medicine “needs to be challenged and pushed into unfamiliar territory”.

Medical anthropology has shown considerable advances in focusing on the complex entanglements between humans, nonhumans, and ecologies in studying zoonotic and non-zoonotic diseases [25]. Anthropologists have been describing the emergence of diseases at the convergence of political designs, economic strategies, land degradation, affective complexities inherent in cohabitation, and practices of care that exacerbate conditions for disease communicability [26]. More-than-human histories of disease and health can improve their analysis through a closer engagement with critical medical anthropology.

Multispecies entanglements “foreground how humans, animals, pathogens, and parasites are all enmeshed in our collective sickness, suffering, treatment, care, and death” [26].

The analysis of disease ecologies from a multispecies perspective can be a valuable lens to capture the material configurations of landscapes in the past, helping to revitalize the study of material histories of environment

and disease in the context of the Anthropocene.

There is a methodological tension in the employment of scientific knowledge in a multispecies analysis of diseases as environmental phenomena. As argued by Vanessa Heggie [24], “There is a recurrent and unresolved debate about how to combine histories that use scientific data – including cliometrics – to frame their arguments, with an ideological commitment to the idea that science is a socially constructed form of knowledge, made by particular people, in certain societies, at specific times.” This difference in taking scientific findings as evidence rather than as a matter to be inquired has been a persistent hindrance in more effective crossings between environmental history and the history of science.

In most cases, material and multispecies histories of disease draw on the most recent findings from scientific areas such as disease ecology, microbiology, evolutionary biology, immunology, genetics, archaeology, paleoecology, and epidemiology. There is no agreement, even among historians of medicine, on the application of genetic information to perform retrospective diagnosis. It is a very opportune dialogue, but it demands that we subject scientific knowledge to scrutiny.

Concerning ecology and evolutionary biology, an overemphasis on parasite-host biological interactions can downplay the dynamism of changing environments throughout history. Unilaterally aligning with one trend in science can distort the resulting analysis, as Nash [27] points out in the case of early environmental histories, excessively based on ecological notions of a preexisting natural balance disturbed by technology. For most of the 20th century, ecologists imagined ecological communities as stable configurations seeking equilibrium. However, by the end of the century, the focus shifted to ecological disturbances, understood as openings for new configurations. Anna Tsing adopts this idea to explore ecologies emerging in human-disrupted landscapes [28]. Human-disturbed landscapes can be related to the Niche Construction Theory, developed in evolutionary biology and ecology [29].

The Niche Construction Theory proposes that organisms play an active role in shaping their environment by engineering ecosystems for adaptation purposes, modifying natural selection pressures on their evolution and other organisms with whom they share the habitat. Applied to human beings, the Niche Construction Theory highlights the dynamic character of biological processes and integrates the role of social and cultural elements in shaping ecologies. Humans have modified overlapping ecosystems through social, political, cultural, and

economic rationales at different scales, creating evolutionary opportunities for microbes to generate diseases [30]. In Tsing's synthesis [28], "Niche Construction Theory" argues "that organisms work as ecosystems engineers, that is, they change habitats to make them more advantageous." According to Tsing: "Pretty much all organisms, it seems, remake the worlds around them. These remade worlds, in turn, become the habitats in which both their conspecifics as well as other species take up their lives and reproduce." [28]

While the theory can help historians to outline the dynamism of feedback loops in past environments, historians can contribute by bringing cultural, political, and economic complexity to the framework. In this way, they minimize the risk of excessive biologizing human issues, reducing individual and social actions to evolutionary trends [31].

In her Ph.D. dissertation, Emily Webster [31] employs the Niche Construction Theory to analyze three epidemic diseases that broke out in three port cities of the British Empire. She examines how formal and informal processes of the British Empire shaped ecological niches that favored the evolution of microbes, resulting in the emergence of epidemics among novel places and populations. While the imperial circuits of trade spread microbes in urban hubs, the thriving of epidemic diseases depended on highly specific ecological niches.

There is an attempt in One Health to incorporate socioeconomic and other anthropogenic dynamics into the analytic frameworks of disease ecology. Recent ecological studies have integrated the role of contingency and context, bringing social science and historical research findings into the inquiry of the relationship between land use management and ecological processes. Warwick Anderson [32] suggests a stronger connection between ecology and social medicine to counteract the "ecological and sociological impoverishment of pre-COVID-19 imaginings of biosecurity and preparedness".

Under the light of the Niche Construction Theory, the Anthropocene emerges as the condition in which humans have altered the survival and evolutionary processes of practically all other organisms on Earth through their interference with planetary biogeochemical dynamics. A closer engagement with the concept of Niche Construction can contribute to more interactive notions of the environment. Chris Otter, Nicholas Breyfogle, and John Brooke [30] employ the idea of new evolutionary niches in analyzing pathogen-ecology systems in the Anthropocene. According to them, six aspects need to be considered when examining that

process: the role of technological networks, ecological disruptions, new evolutionary niches, novel materials, knowledge production, and what they call "mismatch diseases" – pathologies that result from a disjuncture between bodies - and reconfigured technological landscapes. They emphasize how the construction of substantial infrastructure systems with subsequent disturbances of ecologies, the massive establishment of technological networks, and the unprecedented transfer of organisms, including parasites and microbes, have generated ecological niches with novel opportunities for microbial evolution and disease outbreaks. Due to the global reach of technological networks connecting vast distances, Otter and colleagues [30] declare that "total epidemiological isolation is definitively terminated; even the most remote locations are now part of the global disease pool".

The Niche Construction Theory and other concepts from ecology can be helpful for historians in outlining past disease landscapes, but ecological perspectives can sometimes obscure broader social, political, and economic forces. Adopting the political ecology framework can help to examine the role of these forces in shaping uneven landscapes of exposure to environmental risks, such as pathogens or toxins, or what Gregg Mitman [33] calls the "ecology of injustice".

At a more fundamental level, the planetary condition in the Anthropocene calls for considering the deep histories of humans in their entanglements with nonhumans, transcending the conventional anthropocentric scales and the usual understandings of historical time. Chakrabarty argues that the historical condition in the Anthropocene entails articulating human and planetary time within a multi-scalar framework [34]. This attitude requires the use of historical evidence from alternative sources. Historians need close cooperation with archaeology, genetics, evolutionary biology, anthropology, and paleoecology disciplines. Andrew Shryock and Daniel Smail [35] proposed deep history as a new framework encompassing the entire timespan of human species development, integrating perspectives on biological and cultural changes. Similarly, Edmund Russell [36] developed the subfield of evolutionary history to examine larger timescales, the coevolution of humans with nonhumans, and humans' role in shaping the evolution of other species within social, economic, and technological contexts.

These proposals have clear implications for the history of diseases. The historiography of diseases includes works that narrate the historical trajectory of diseases

on broad timescales. Two notable examples are Alfred Crosby's [37] "The Columbian Exchange" and William McNeill's [38] "Plagues and Peoples," both published in the 1970s. As Linda Nash [27] demonstrates, these works were influenced by concepts developed in disease ecology, a discipline that situates diseases in terms of ecological and evolutionary interactions involving parasites and hosts, humans and nonhumans. The concept of differential immunity was particularly decisive for their narrative of historical macro processes, such as the colonization of the Americas, the rise and fall of empires and religions, and major migrations. Such large-scale narrative has the potential to attract wider audiences to history. It aligns with the agenda proposed by Jo Guldi and David Armitage [39] in their "The History Manifesto," which calls for new directions in the historical craft, seeking broader public relevance through synthesis works and narratives on larger timescales that connect local and global processes.

The pandemic significantly boosted the interest in the history of diseases by non-specialized audiences. Confronted with the challenges of the Anthropocene and the planetary regime, historians are compelled to draw upon much more complex understandings of immunological systems, the relationships between humans and the microbial world, disease ecologies, and human agency amidst entanglements with nonhumans. Concepts such as Holobiont and symbiogenesis call for historical narratives that differ from those elaborated by Crosby and McNeill, which were undoubtedly masterpieces within their time's intellectual context, but framed diseases in much more binary terms of pathogens and hosts.

The History of Tropical Medicine at the crossroads of the Planetary Age

The history of tropical medicine is particularly well-positioned to address some of the challenges in the writing of disease history in the Anthropocene. Historians of tropical medicine have extensively observed how doctors trained in that specialty were receptive to ecological approaches in understanding and controlling the then-called "tropical diseases" [18, 36, 40]. Those diseases involved complex parasitic life cycles that intertwined humans, nonhumans, and local ecologies, requiring an understanding of broader biological processes. It is not coincidental that insights into disease ecologies developed particularly among specialists in tropical medicine, veterinary pathology, and immunol-

ogy, as argued by Warwick Anderson [18].

The entanglements between humans and nonhumans and the close interface between medical and veterinary medicine represented by the One Health approach are familiar to historians who study tropical medicine. An ecological understanding of the outbreaks of sleeping sickness in colonial territories in the early 20th century, for example, involves examining the occurrence of rinderpest in cattle in Africa in previous decades [36]. Historical sources concerning tropical/colonial medicine suit this junction between human and veterinary medicine. Researchers in tropical medicine were generally interested in deciphering the biology of parasites and vectors, studying agents of human and animal diseases together.

It is worth mentioning the works of Barbara Direito regarding the socioenvironmental dimensions of veterinary medicine in Mozambique. Direito analyzed extensively administrative sources from the official services in Mozambique, as well as publications in specialized and non-specialized vehicles to address the efforts designed to fight diseases like rinderpest [41] and the policies of cattle improvement, examining how the specialized discussions were permeated by popular scientific theories and by African apprehensions of the local environment and exotic cattle types [42]. She aligns herself with a growing historiography exploring how managing animal diseases legitimized restrictions of the African populations in terms of access to natural resources. This attitude helped to deepen the social and racial fissures in colonial societies [41].

In a genealogy of the concept of disease reservoirs, da Silva and cols. [43] showed how colonial medical practices applied the category of disease reservoirs to humans and animals alike with the aim of outlining the spaces of contagion involving humans, animals, and pathogens. After the 1920s, the concept became more employed to design animals rather than humans and environments, argued the authors. They asserted that "the notion of disease reservoirs is thus intimately intertwined with concerns over the classification, organization, and management of peoples, pathogens, animals, and space" [43].

The complex epidemiological chains involving parasites, human populations and nonhuman vectors located in landscapes disturbed by colonial and national-state projects favored detailed observations of disease ecologies by scientists devoted to studying and controlling tropical diseases. As shown by historiography, these observations contributed to establishing an ecological

perspective on infectious diseases [18,40]. Reports on landscapes and control efforts aiming to tackle those complex ecologies constitute rich historical sources that have been used not only by medical historians but also by environmental historians [44]. The formulation of concepts such as “man-made malaria” by scientists, for instance, demonstrates a recognition of the impact of human activities in generating disease ecologies [45]. Studies on the history of malaria research have shown how some research groups embraced an ecological approach to understanding and fighting the disease, like the team assembled at the Emory Field Station, examined by Albert G. Way [46]. More recently, Jaime Benchimol and Cláudio Peixoto [47] explored the intricate process of scientific production about leishmaniasis in Brazil in the second half of the 20th century, analyzing how researchers correlated the disease emergence with ecological degradation in the Amazon provoked by large-scale infrastructural works, like the Transamazônia highway.

The history of tropical medicine also familiarizes scholars with debates on the relationships between climate, disease, ecologies, and societies in the past, a topic that gains increasing relevance in the current context of global climate change [48]. Such debates revolved at that time around the issue of acclimatization – about the convenience and possibility of establishing plants, nonhuman animals, and human populations in environments and climates different from their places of origin [49]. Global warming forecasts the risk of vectors advancing into temperate latitudes and the resurgence of diseases once controlled in those regions. A historical perspective helps to highlight how the construction of the “tropical world” as a place of specific diseases is a historical contingency that can be altered when the planetary climate changes. Taking the climate crisis as a health issue, “it is essential that historians are able to rise to the challenge of telling a clear and instructive story about the ways in which environmental harm is done to people and communities, how this had been mitigated, or ignored and downplayed,” claimed Heggie [24(42)]

As is well-known among historians of tropical medicine, debates on the climate’s role in shaping societies and diseases were closely intertwined with the framing of “race” as a category for classifying human diversity, a discursive rethoric used to legitimize colonial rule. Biomedical discourses focus on microbial and parasitic etiologies kept earlier racist perspectives grounded in environmental approaches, according to which local

nonwhite populations were considered threats to European groups in colonial settlements [50 (60)].

Some scholars argue that the mobilization of the race category by colonial and national regimes was closely followed by species distinction. Discourses asserting the exceptionalism of the human species are part of the same cultural matrix that relegates nonwhite and colonial subjects to hierarchical levels equivalent to nonhuman animals. The racial hierarchies in colonial settings were mirrored in human-animal relations, with Europeans in the higher levels. At the bottom, were nonwhite populations, portrayed as closer to animals and harbingers of parasites due to their unhygienic, namely uncivilized, habits. Women were also marginalized as part of the same process of trying to control local ecologies to make way for homogeneous monocultures, such as plantations.

For this reason, scholars like Donna Haraway and Anna Tsing suggest the term “Plantationocene” as an alternative name to the Anthropocene, emphasizing these intersecting processes. According to Tsing [51], in the plantation zones in colonial settings, where native and foreign, free and enslaved, wild and tame were intermingled, “white women became responsible for maintaining the boundaries of homes, families, species, and the white race.” While in the tropics, white women kept the “hygienic frontier” in the domestic sphere, in the colonial metropolises, public and private hygiene helped to distinguish between upper-class women, “the angels of the house,” and poor women, agents of infection. The history of tropical medicine has contributed to unraveling asymmetries of gender, race, and class in the colonial settings reproduced and legitimized by medical discourses.

As we can see, despite the numerous open questions regarding how to practice historical science in the Anthropocene, the history of diseases and tropical medicine are well-positioned to provide critical tools for the debate. They are subfields of history where the transdisciplinary exchange is part of routine work, particularly in engagement with natural sciences. Thinking within a multispecies framework is familiar to the practitioners of this intellectual field. The interest in contributing to and engaging with approaches in public health is recognized as relevant to our field.

Some Concluding Remarks

As argued by Helmuth Trischler [62], the Anthropocene is a scientific and cultural concept that denotes a set

of transformations provoked by human activities in the dynamics of the Earth System. This concept, regardless of validation by the Commission on Stratigraphy, has gained traction in various fields of knowledge for designating processes such as climate change and mass species extinction. The COVID-19 pandemic has been categorized as a “disease of the Anthropocene” because it represents an expression of the overlapping crises that characterize the planetary condition in the Anthropocene. For authors like the Indian historian Dipesh Chakrabarty, the Anthropocene signifies the emergence of the planet on the horizon of humanistic reflections, inviting a decentered perspective on humans, who are now considered “latecomer guests” of a habitat with a much broader history and an agency of its own. The planetary condition reminds us that we are embedded in deep geobiological histories, and pandemics like Covid-19 unveil our dependence on the broader web of life. Approaches such as One Health and Planetary Health have emerged as attempts to understand human health as inextricably connected with the integrity of ecosystems and within a framework that prioritizes the entire web of life, not solely the human species.

The planetary condition is closely aligned with the idea of viruses as symbiotic partners. Theories of symbiogenesis, coevolution, and concepts like holobiont and endosymbiosis have favored the understanding of humans as multispecies assemblages embedded in entanglements with the more-than-human world. COVID-19 has brought more emphasis to this perspective, pushing for a more integrative approach to the history of diseases, framing them as events located in multispecies assemblages. In addition to a closer connection between environmental and medical history, as a ‘disease of the Anthropocene’, COVID-19 has reinforced the relevance of an ecological understanding of health and disease phenomena. Multispecies studies, widely employed in ethnography, emerge as a fascinating perspective for understanding diseases as historical phenomena resulting from entanglements between pathogens

and human and non-human hosts. They also highlight landscapes as materialities traversed by these multiple entanglements. The use of a multispecies perspective in the history of diseases implies methodological tensions regarding how to mobilize scientific knowledge in explaining past nosological phenomena. Nevertheless, the dialogue with the fields of evolutionary biology and ecology has been fruitful. The Niche Construction Theory, for example, can represent an interesting tool for understanding diseases in the Anthropocene regime, characterized by the planetary scale of anthropogenic actions. The theory enables us to understand how the impacts of human actions on ecosystems have modified selective pressures on pathogens, contributing to disease incidence. It allows us to understand diseases as long-term historical phenomena, following in the line of classical works that connected the history of diseases and environmental history, such as those of Alfred Crosby and William McNeill. Thus, the history of diseases meets the challenge of the Anthropocene to connect multiple temporal scales.

Remarkably, the history of tropical medicine proves to be a field particularly conducive to addressing the challenges imposed by the Anthropocene by dealing with diseases marked by ecological complexity through the entanglement of parasites, hosts, and local ecologies. The history of tropical medicine has also dealt with the intertwining of human and animal pathology and debates connecting pathologies with climate.

Therefore, the planetary condition presents epistemic and methodological challenges that invite a renewal of the intellectual tools employed in the study of the history of health and diseases while also calling for a reconsideration of analytical approaches that have already been applied by historiography.

Conflict of interest

The author declares that there are no conflicts of interest.

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