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GUILLAUME LINTE & PAUL-ARTHUR TORTOSA

"The Most Unhealthy Spots in the World"

Thinking, Dwelling In, and Shaping Pathogenic Environments

▼ **SPECIAL ISSUE ARTICLE** in *Pathogenic Environments*, edited by Paul-Arthur Tortosa & Guillaume Linte

▼ **ABSTRACT** This paper deals with the history of "pathogenic environments," understood as places, regions, or environments whose characteristics are considered to be the origin of diseases in the human beings. While some specific environments were almost universally considered noxious, some others had a different trajectory. Crowded and poorly-ventilated premises as well as tropical regions were perceived as "the most unhealthy spots in the world." However, the progressive "medicalisation" of hospitals transformed what were previously considered to be hellholes into therapeutic places. This does not mean that iatrogenic diseases disappeared, but that hospitals tended to be seen in a more positive way. Similarly, European colonial expansion changed medical perspectives on tropical regions. Western physicians became increasingly convinced not only that could they prepare Europeans for long travel, but also that they could shape foreign environments. For instance, the perception of the Caribbean climate gradually changed "from deadly to healthy" from the middle of the 19th century onwards. Changes in perceptions could thus follow scientific progress, but also arise from political agendas and stigmatising narratives. Victims of the harmful influences of a pathogenic environment were often presented as responsible for their fate. For instance, some were accused of not carrying out the instructions delivered by the administrative or medical authorities.

Guillaume Linte 0000-0002-0222-0053 • University of Geneva, Switzerland, correspondence: Guillaume Linte, iEH2—Institute for Ethics, History, and the Humanities, Centre Médical Universitaire, 1 Rue Michel Servet, 1211 Geneva 4, Switzerland. guillaume.linte@unige.ch

Paul-Arthur Tortosa 0000-0002-1872-984X • Université de Strasbourg, France, correspondence: Paul-Arthur Tortosa, Université de Strasbourg, SAGE 11 rue des Juifs, 67000 Strasbourg, France. patortosa@unistra.fr

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The process of (un)making pathogenic environments thus offers privileged access to the understanding of the relationship between health and environment. This paper provides situated accounts of how some places or regions came to be perceived as pathogenic or ceased to be so. It explores avenues of research, such as the study of lay perspectives on health and environment, the dangers of travel itself, and the connection between environmental health and military medicine.

▼ **KEYWORDS** 17th and 18th Centuries, 19th and 20th History of Medicine, Political History, Social History of Science, Colonial Medicine, Popularisation of Science, History of Health

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Since the beginning of the 21st century, international public health institutions, governments, as well as the scientific community, have promoted a holistic approach to health issues. This is also known as "One Health" and links human, animal, and environmental health. The multiplication of (re)emerging diseases from the 1970s onwards, as well as the growing concern regarding antimicrobial resistance, had indeed dashed scientists' hope to "close the book on infectious diseases" and led to the idea that human health was inextricably linked to environmental issues.[1] In recent decades, historians have also extensively reflected on the relationships between the environment and health.[2] This collective endeavour culminated in special issues in *Medical History* (2000), *Osiris* (2004), and *Bulletin of The History of Medicine* (2012), titled "Medical Geography," "Landscapes of Exposure," and "Modern Airs, Waters and Places," respectively.[3] Far from being characteristic of modernity, such place-centred approaches to health are almost as old as Western medicine, since they lie at the heart of the Hippocratic treatise *Airs, Waters, Places* (ca. 430 BCE). Two millennia after Hippocrates' death, the Greek physician was still widely mentioned and the influence of climate on human beings was still a cornerstone of medical thought. However, semantic stability does not necessarily imply lexical stability, since the very concepts of "climate" and "environment" have changed drastically over the last three centuries. Thus, it reminds us of statistics, which Alain Desrosières compared to a knife whose handle and blade had been changed and whose ipseity is in question.[4] Moreover, ideas and practices often have interconnected but discrete

1 This famous quote is often mistakenly attributed to William Stewart, who never uttered it, but this hope was widely shared in the medical community; see Spellberg & Taylor-Blake (2013). On the history of One Health, see, for instance, Hendricks, Newton, & Rubenstein (2009); Chien (2013); Cassidy (2016). For a critical perspective of the concept of One Health, see Wolf (2015); Michalon (2019).

2 Ackerknecht (1972); McEvoy (1995); Tarr (1996); Sellers (1997); Melosi (2000); Anderson (2004); King (2004); Tilley (2004).

3 Rupke (2000); Mitman, Murphy, & Sellers (2004b); Bashford & Tracy (2012b).

4 Desrosières (2010).

trajectories; supposedly "groundbreaking" discoveries, such as germ theory, do not necessarily lead to drastic changes in public health practices and policies.

In this special issue, "pathogenic environments" are understood as places, regions, or environments whose characteristics are considered to be the origin of diseases in the human beings who live, occupy, or work there, and/or that may possibly promote their spread. While wetlands, factories, and tropical regions were almost universally considered noxious, at least by Western physicians, some other types of places had a different trajectory. For instance, crowded and poorly ventilated premises were the archetypes of pathogenic environments in the 18th century; they even gave their names to some diseases—namely, the "hospital," "ships," or "prison" fevers—while tropical regions were perceived as "the most unhealthy spots in the world."[5] However, the progressive "medicalisation" and sanitation of hospitals in the 19th and 20th centuries transformed what were previously considered to be hellholes into therapeutic places.[6] This does not mean that iatrogenic diseases disappeared, but that hospitals tended to be seen in a more positive way.[7] Similarly, European colonial expansion changed medical perspectives of tropical regions; Western physicians became increasingly convinced not only that could they prepare Europeans for long travel, but also that they could shape foreign environments.[8] For instance, the perception of the Caribbean climate gradually changed "from deadly to healthy"—and even pleasant—from the middle of the 19th century onwards, especially due to the development of tourism.[9] Changes in perceptions could thus follow scientific progress but also arise from political agendas. The process of (un)making pathogenic environments thus offers privileged access to the understanding of the relationship between health and environment. This special issue offers situated accounts of how some places or regions came to be perceived as pathogenic or ceased to be so. It provides the reader with an intellectual, social, and political history of medicine and explores avenues of research that opened up in the previous special issues on the topic, notably the study of lay perspectives on health and environment, the dangers of travel itself, and the connection between environmental health and military medicine.

5 Lind (1768, p. 147).

6 On the history of the medicalisation of hospitals, see Faure (1982); Goubert (1982); Imbert (1982); Rosenberg (1995); Keel (2001). On the tension between the therapeutic and pathogenic nature of early modern hospitals, see Tortosa (2021).

7 Carricaburu & Lhuilier (2009); Condrau & Kirk (2011).

8 Riley (1987).

9 Carey (2011, pp. 138–142).

Thinking Pathogenic Environments

Between the Topocentric Approach and Place-Neutral Medicine

It is a historical *topos* to describe 18th-century medicine as driven by a "topocentric approach."[10] From this perspective, the key theory linking health and the environment was neohippocratism, an eclectic set of theories built around four characteristic features.[11] First, it distinguished endemic and epidemic diseases, the former being associated with a specific place, unlike the latter. Second, the idea that diseases can be best understood and captured through "medical topographies," which combine a physical description of a place (village, city, region) with an analysis of the prevalent diseases there, was crucial.[12] Third, it stated that geography affects the nature of diseases and, thus, the choice of therapeutics.[13] Finally, certain types of places (such as swamps or workplaces) were considered to be pathogenic environments producing specific diseases. Yet, unlike works where "Hippocrates' text floats like a numerical constant, unchanged from era to era," this special issue takes neohippocratism as an *explanandum* and studies the implications of this notion for actors in different times and places.[14] The narrative of a neohippocratic hegemony is too simplistic, for it does not account for how people precisely explained the influence of the environment over health. Every physician acknowledged that health and environment were somehow related, but there was no consensus on how these notions interacted. Moreover, the very notion of the environment itself was highly debated and dynamic. At the end of the 18th century, with the development of chemistry, the old paradigm of a fixed climate determined by geographical location was slowly challenged by a new conception of climate as "a set of dynamic processes that co-determine the nature of a place."[15] Over time, the relationship between climate and humans "evolved from a dependent one in which human constitution and health are determined by climate to an interdependent one in which humans and climate influence each other."[16] Neohippocratism was not a unified realm and looked more like a shared house in which many different theories and concepts coexisted and were merged. Sometimes, it was even a disputed battlefield where a multiplicity of competing but also, occasionally, complementary approaches coexisted.[17]

Drawing on the "spatial turn," Christopher Sellers argued that one of the key features of 19th-century medicine was "its aspirations for a kind of place—or environ-

10 Jankovic (2010, p. 3).
11 Wear (2008). For an overview of 18th-century medicine, see Brockliss & Jones (1997).
12 Barret (1993). On medical topographies, see Peter (1967); Rofort (1987); Moussy (2004); Edrom (2018).
13 Harrison (1992); Chakrabarti (2013); Linte (2019).
14 Valenčius (2000, p. 8). Miller (1962); Sargent (1982); Osborne (1996); Grmek (1997, p. 169).
15 Fressoz & Locher (2010). On the chemical revolution, see Bensaude-Vincent & Stengers (1993, pp. 50–65); Mazauric (2009, pp. 291–302); Lequan (2010).
16 Bashford & Tracy (2012a); Taylan (2018).
17 On the coexistence of diverse "ways of knowing," see Pickstone (2000). On the discontinuist approach in the history of science, see Kuhn (1962); Foucault (1963; 1969).

mental—neutrality."[18] From this perspective, physicians could neglect environmental influences and apply the same therapeutics to everyone, everywhere. This shift towards "place-neutral medicine" was made possible by the development of specialised places of cure, namely, medicalised hospitals, which were sanitised so that the medical environment would presumably contribute less to patients' diseases.[19] Paradoxically, Sellers remarked, the rise of place neutrality was concomitant with the development of place-based health specialties, such as tropical medicine or occupational health. Therefore, despite 19th-century medicine's aspiration to place neutrality, factories, overcrowded cities, and tropical regions were kept under close surveillance. Even the development of germ theory did not sound the death knell of interest in pathogenic environments.[20] Bacteriological reductionism obviously challenged environmental aetiologies, but to what extent? Michael Worboys notoriously claimed that "a Bacteriological Revolution in late nineteenth century medicine in Britain remains unproven," arguing that "historians have read into the 1880s changes that occurred over a much longer period."[21] Moreover, according to David Barnes, "the germ theory of disease changed everything and nothing at all" since the practical strategies for preventing disease were not affected much by this intellectual revolution. Drawing on the cultural history of the senses, he argued that former understandings of the environment were not erased by germ theory; instead, he insisted on the development of a "framework that structures perception, knowledge and behaviour concerning bodies and disease," mixing old and new conceptions that he called the "sanitary-bacteriological synthesis."[22] Even from a purely intellectual perspective, early 20th-century debates show that the new bacteriological knowledge of disease was still challenged, sometimes successfully, by other medical specialties.[23] More generally, holistic perspectives remained strong even after the 1920s, which reminds us that bacteriology was not entirely hegemonic even in its heyday.[24] Moreover, it appears that if Linda Nash's thesis of a "brief period of modernist amnesia" regarding the influence of the environment on health in the late 19th and early 20th centuries might apply to the United States, it can hardly be extended to the rest of the world. On the contrary, environmental approaches to health through this period and beyond appear to have lingered, "although the rise of laboratory medicine supposedly eclipsed a Hippocratic emphasis on airs, waters, and places."[25]

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18 Sellers (2018, pp. 6–7). On the "spatial turn," see Withers (2009); Kingston (2010).
19 Sellers (2018, pp. 9–16).
20 On the bacteriological revolution, see Latour (1988); Mendelsohn (1996).
21 Worboys (2007).
22 Barnes (2006, pp. 2, 262). On the ambiguous use of germ theories in the purification of sewage, see Platt (2004).
23 Kroker (2004); Teicher (2020); Vagneron (2021).
24 Lawrence & Weisz (1998).
25 Mitman, Murphy, & Sellers (2004a, p. 9). On the "brief period of amnesia," see Nash (2006, p. 6).

The Politics of (Un)Making Pathogenic Environments

Aetiology is a scientific problem but also a political issue, for causation is linked with accountability.[26] By their very nature, aetiological discourses can be used to accuse certain people of being responsible for epidemics and to exonerate others. However, it is crucial to note that attributing disease to a pathogenic environment can serve clashing economic and political interests. For instance, Jean-Baptiste Fressoz demonstrated that "the shift from environmental aetiologies to social issues"—that is, the general insistence that most diseases suffered by workers stemmed from their bad behaviour and not the toxicity of their working environments—made it possible for factory-owners to claim that industrial development was not a threat to the health of city-dwellers.[27] In contrast, Alain Cottereau explained that the "environmental shift" of tuberculosis, understood as an urban disease instead of a consequence of work exhaustion, made it possible for French authorities to deny crucial health care to the most vulnerable members of the working class.[28] In these two case studies, similar economic interests led to the promotion of opposed aetiological stances. This is a reminder that there is no such thing as a universal political meaning, either of contagionism and anticontagionism, or of blaming a specific region or place instead of its population. Instead, the politics of aetiology depends on intellectual, social and economic contexts.

Since aetiological knowledge can have significant weight in political debates, it encourages experts and laymen to perform "aetiological work" in order to establish with certainty and precision the noxiousness of regions and places.[29] However, for the very same reason, aetiological work is not always conducted to enhance the existing body of knowledge; it may even have the opposite aim. In 2004, Mittman, Murphy, and Sellers stated that uncertainty was a key feature of the history of exposure, putting forward concepts such as "geographies of unknowing" and "regimes of imperceptibility."[30] This suggestion proved to be fruitful and was largely explored in the newborn field of agnotology, which studied of the making and unmaking of ignorance.[31] From this perspective, doubt, uncertainty, and ignorance should not be treated as the lack of knowledge but as social constructs; we end up "ignoring what we do know" because of the deliberate action of "merchants of doubts."[32] Even though Robert Proctor's seminal study of the tobacco industry's efforts to downplay the dangers of smoking focused on recent history, several historical works have highlighted similar strategies as early as the late 18th century.[33] Challenging Ulrich Beck's narrative of a "reflexive" second modernity in contrast to a "naïve" first modernity—the latter unaware of the

26 Hamlin (2014, p. 12). On the politics of aetiology, see Ackerknecht (1948); Baldwin (1999).
27 Fressoz (2009, p. 90). For the British context, see Hamlin (1998).
28 Cottereau (1978).
29 Jouzel (2019, p. 13).
30 Mitman, Murphy, & Sellers (2004a, p. 13).
31 For a synthesis on agnotology, see Proctor & Schiebinger (2008); Girel (2017).
32 Oreskes & Conway (2010); Dedieu & Jouzel (2015); Jouzel (2019).
33 Le Roux (2011); Proctor (2012); Rosental (2017); Rainhorn (2019); Bonney (2021).

damage it was doing to health and the environment—historians have argued that the deliberate efforts of industrialists to minimise the harmfulness of their activities were as old as industrialisation itself.[34] In this context, this special issue aims to reveal how ignorance or uncertainty about the pathogenic nature of specific environments was deliberately produced by actors who wanted to avoid being held responsible for specific diseases. The key actors in these endeavours were large companies, states, and imperial powers, which makes it necessary to go beyond an intellectualist tradition that focuses on medical ideas, specialties, and institutions.[35]

A Social History of Pathogenic Environments

Dwelling in Pathogenic Environments

Exploring the social history of pathogenic environments requires a multi-scalar approach, allowing for the identification of local, regional, and global issues surrounding human activity. The development of European empires has, for instance, largely reshaped the geography of terrestrial habitability and defined specific areas, particularly those in the tropics, as unhealthy since the 15th century.[36] Similarly, urbanisation and industrialisation in the mid-18th century encouraged new social norms based on fears surrounding the influence of polluted air and filthy environments on health, as well as on the comfort that was seen as inherent to the bourgeois way of life.[37] Between the end of the 19th century and the middle of the 20th century, massive industrialisation and the emergence of the working class reinforced the social representation of disease, linking lifestyle and the environment. Tuberculosis, one of the three so-called "social diseases" (along with syphilis and alcoholism) associated with this period, was a condition that exemplifies not only the close relationship between health and the environment but also that between social class and overcrowded cities.[38] It emphasises the fact that pathogenic environments are socially constructed and socially experienced to equal extents. As Lea Delmaire demonstrates in this special issue, through the example of the *gecekondu* of Istanbul in the 1960s, these questions remain largely relevant even after the Second World War.[39]

Among human activities, movement, commerce, and war were important drivers of the reconfiguration of relationships between humans and pathogenic environments. According to Jan Golinski, maritime trade and migration have long been perceived as risk factors in North America. Urban sanitation, especially in the context of yellow fever epidemics, contributed to reshaping "how many Americans thought

34 Beck (1992); Fressoz (2012); Le Roux & Jarrige (2017).
35 Nash (2018, pp. 50–52).
36 Cagle (2018); Cattaneo (2009); Cosgrove (2005); Gautier-Dalché (2017).
37 Le Roux (2011); Jankovic (2010); Fressoz (2009); Tullett (2021); Brown (2008).
38 De Luca Barrusse (2013); Barnes (1995); Miralles Buil (2017).
39 Delmaire (2023).

about the role of climate in their national life."[40] The influence of trade on the understanding of environments and the global nature of pathogenic risks has been the subject of numerous studies.[41] In his article on the medical history of the Napoleonic campaigns in Northern Italy, Paul-Arthur Tortosa highlights warfare as another central activity in the production of knowledge about pathogenic environments, as well as the laboratory for solutions to limit their influence.[42]

Relationships between societies and pathogenic environments, as well as the production of knowledge, have largely been considered from a static point of view, focusing on the intertropical space, the industrial city, the factory, and so on. However, it is also important to consider these issues from a dynamic perspective; for instance, the movements of armies during the Napoleonic wars and long-distance maritime travel may create new environments and shape existing ones.[43] Thinking, living in, and shaping pathogenic environments is part of the history of human mobility, with more complex and fluid relations than just moving from one place or milieu to another.

Shaping Pathogenic Environments

The fight against pathogenic environments has taken many forms since the 18th century; ventilation, fumigation, masks, the introduction of animals tolerant to specific infectious agents, and urban planning have all been ways of dealing with environments that present a threat to health.[44] Thomas Schlich and Bruno J. Strasser highlighted, for instance, that surgical masks were first developed in other contexts than hospitals, mainly for protection from the pathogenicity of a certain milieu, before becoming a medical accessory in connection with the emergence of germ theory.[45] The development of artefacts or machines operating at different scales to make a pathogenic environment less harmful has a long history. In this special issue, Guillaume Linte shows how the issue of ship ventilation was crucial to controlling diseases at sea, justifying a major effort of innovation and investment in devices such as ventilators by the 18th-century French navy.[46] This was a widespread initiative in Europe, especially in Great Britain, and across many contexts, such as mines or hospitals, as well as domestic environments.[47]

The perception of pathogenic environments not only shifted according to the evaluation of their pathogenicity, but also anticipated the possibilities and benefits of (re)shaping them to make them healthier. Urbanisation, industrialisation, and colonisation have confronted societies with the problems of noxious air, polluted

40 Golinski (2016).
41 Harrison (2010); Cagle (2018); Grove (1995); Crosby (1972).
42 Tortosa (2023).
43 Goubert (1974); Tortosa (2021).
44 Fressoz (2009); Le Roux (2016); Serrano (2018); Engelmann & Lynteris (2020); Coghe (2022).
45 Schlich & Strasser (2022).
46 Linte (2023).
47 Sampson (2021); Zuckerman (1987); Thébaud-Sorger (2018; 2020).

soil, and infested places. Since the 18th century, the narrative of human action on pathogenic environments has often been presented as a history of scientific and medical "progress," a story of how mankind came to "dominate" nature, people, or any sanitary challenges that stand in the way of industrial development and the flourishing of capitalism. In the early 20th century, for instance, "the equatorial region was reconfigured from a place hostile to civilisation to one that a relatively self-sufficient white civilisation could transform, 'modernise' and exploit."[48] Views on the health of European populations in the colonies located between the tropics vacillated over time between optimism and pessimism, often linked with racial considerations.[49] In the 18th century, colonial settlement was encouraged by a more optimistic view of the capacity of Europeans to adapt to intertropical areas, sustained by medical topographies. The conception of a "Torrid Zone" where climate is equally harmful everywhere was eventually abandoned, replaced by a localised description of all the influences that can make a place healthy or unhealthy.[50] General perspectives on the tropics were more pessimistic from the late 18th century onwards.[51] In the 19th century, there was a greater focus on fighting the diseases themselves and their manifestations, rather than the environments that produced them, especially through the use of quinine.[52] Even if in some contexts "climate and vegetation had been reduced, disarmed, and exonerated" of their pathogenic influence and racial determinism, Costanza Bonelli shows how the issue of acclimatisation still determined the colonial health strategy of the Italian Fascist Empire in Africa before the Second World War.[53]

It is evident that attempts to shape pathogenic environments or limit their influence on humans' health were not always successful, leading to failures in implementing technical devices or sanitary regulations, or even the abandonment of settlements or industrial exploitation. Some colonial projects, for example, were conditioned by the impossibility of effectively combating environmental influences, such as Grand Bassam in Côte d'Ivoire at the turn of the 19th and 20th centuries.[54] Moreover, the actual success of an action to overcome a pathogenic environment could be scientifically or socially contested. Reaching a consensus usually required negotiation between the different actors involved, because creating or re-establishing confidence in the safety of an environment was key to the success of any project.

Blaming Places, Stigmatising People

Finally, this special issue analyses the process of stigmatisation in societies confronted with pathogenic environments. It highlights the shift from the stigmatisation of a place based on its disease-producing characteristics to the stigmatisation of

48 Anderson (2003, p. 43).
49 Anderson (2003; 2006); Harrison (1999); Doron (2016); Safier (2011); Seth (2018).
50 Carey (2011).
51 Harrison (1996).
52 Arnold (1996); Curtin (1985; 1989); Fredj (2017).
53 Anderson (2003, p. 43); Anderson (2006); Bonelli (2023).
54 Cole (2015); Wondji (1972); Adoffi (2016).

populations or groups, who are held responsible for the sanitary deterioration of the place in which they live or work, as well as the failure of their efforts to combat the influences of a pathogenic environment. By exploring the stigmatisation of both an urban space—in this case, the *gecekondu* of Istanbul—and the people who lived there, Lea Delmaire's article brings to light the mechanisms at work in the specific context of Turkey in the 1960s. By analysing how 18th-century French and British navies failed to equip their ships with ventilators, Guillaume Linte's paper shows how this failure was ultimately attributed to the crews themselves, despite the many technical obstacles that made their implementation illusory. These examples underline the interplay between the definition of pathogenic environments, the attempt to reshape them, and the narratives of stigmatisation in human societies. The shift from blaming places to blaming people has been studied from different perspectives. For instance, historians have pointed out how the development of urban centres in Africa led to social and racial segregation, particularly with regard to the diseases that most attracted the attention of the colonial authorities: yellow fever, malaria, and the bubonic plague.[55] Segregation made it possible not only to separate the "pathogenic" bodies of Africans from those of European settlers, but also to provide the latter with a privileged, healthy, ventilated area, far from sources of infection. However, this racial separation was also rooted in the attribution of the failure of health policies implemented in urban environments in sub-Saharan Africa to the colonised populations.[56] Outside the colonial context, other forms of stigmatisation have occurred in the relationship of societies to pathogenic environments. Factories, armies, hospitals, ships, and mines have all been environments in which significant sanitary challenges were associated with social inequalities and strong hierarchical structures among groups of people. Victims of the harmful influences of a pathogenic environment were often presented as responsible for their fate, either because they appeared to contribute to the degradation of their living or working place, or because they would not carry out the instructions delivered by the administrative or medical authorities. In his article in this special issue, Paul-Arthur Tortosa shows how French military doctors accused the Italian population of being responsible for the fevers their army had brought to the peninsula.

Pathogenic environments could not simply be avoided, as they were often of crucial economic or strategic value. They were battlegrounds where political agendas clashed with the lives of the people working and living there. However, although it is essential to consider all voices, historians are constantly confronted with the absence of first-hand sources from workers, sailors, miners, colonial populations, or slum-dwellers. By emphasising the involvement of some lay, invisible, and stigmatised actors, this special issue not only aims to cast a critical eye on narratives that seek to assign responsibility, but also calls into question the way in which expertise and knowledge about pathogenic environments have been legitimised. In addition, it addresses the questions of health education and the popularisation of medical

55 Swanson (1977; 1983); M'Bokolo (1982); Curtin (1995); Goerg (1998); Ngalamulume (2004).
56 Adoffi (2016).

knowledge in Costanza Bonelli's and Marco Omes's papers, while others' contributions emphasise that Napoleonic soldiers, French seafarers, and poor populations of Istanbul were confronted both with pathogenic environments and military, medical, or social hierarchies. Moreover, especially in the colonial context, environmental knowledge and the shaping of disease-causing environments were not only a European—or Western—issue. Largely overshadowed by scientific and official discourses, fighting pathogenic environments was a key issue for precolonial civilisations. For instance, in Central Africa, trypanosomiasis and infestations of tsetse flies had long been identified by local populations as a threat that could be combated.[57] Considering lay knowledge makes it possible both to avoid an overly scientific narrative focused on the lens of public health and to decentralise a gaze that is fixed on the actions of Western medical and administrative elites.

Conclusion

Providing the reader with multiple situated approaches, this special issue offers a three-century-long history of pathogenic environments, studying how they have been thought about, dwelled in, and reshaped by human societies. Drawing on the history of health, as well as social studies of science, it shows that medical discourse has always been both scientific and political. It reveals that there was a multiplicity of situated and strategic uses of environmental and occupational medicine. Physicians were not the only actors to contribute to these debates: military surgeons, municipal authorities, as well as various types of laypeople were also involved. Thus, an internalist history of medicine cannot account for the variety of narratives on environmental health that were developed over the centuries. Moreover, drawing on agnotology, this special issue shows that the production of knowledge and ignorance often went hand in hand. Given their political and economic consequences, aetiological discourses were promoted by a wide range of actors who defended clashing economic and political interests.

Labelling an environment as "pathogenic" was never a neutral action: it led to the stigmatisation of those who lived or worked there, but also allowed resources to be mobilised to remedy the situation. A pathogenic environment can only be shaped after being recognised as such. Environments that were not labelled as unhealthy remained invisible and neglected, as did their inhabitants. However, the fights against pathogenic environments were primarily driven by economic and political issues. The places and people who "benefited" from such mobilisation were neither the primary nor the only motivation behind these projects. Thus, while labelling an environment as pathogenic can promote its reshaping, it can also transform it into a "living laboratory."[58] Unsuccessful attempts to shape such environments had serious implications for both the viability of the projects they were intended to support, and for their

57 Coghe (2022).
58 Tilley (2011).

accountability. Sailors, soldiers, or poor urban populations were simultaneously the first victims of pathogenic environments, and those stigmatised and held responsible for their own fates. In this context, this special issue demonstrates that failure is a key feature of the history of pathogenic environments.

The Anthropocene introduced a change in nature and scale as far as pathogenic environments are concerned. While large-scale hazards were previously linked to "natural" factors, such as the climate of the "Torrid Zone," human influences were established on smaller scales (mines, ships, cities) and anthropic factors now predominate in a "toxic" world.[59] But does this major shift redefine the way in which this issue should be addressed? Is it still relevant to speak of "pathogenic environments" when the whole world has become pathogenic? In the 1980s, Ulrich Beck notoriously claimed that "smog was democratic"; according to the German theorist, unlike 19th-century risks that were local and affected social groups unevenly, 20th-century risks were global and affected everyone alike.[60] However, geographers and sociologists remarked that "some places [were] less smoggy than others."[61] Inspired by Benjamin Chavis's conceptualisation of "environmental racism," scholars and activists demonstrated that environmental health threats were not democratic, and that social minorities and discriminated groups are more likely than others to dwell in polluted places.[62] Even in a globally "contaminated" world, some are still more equal than others as far as pathogenic environments are concerned.[63]

Summaries of the Special Issue Articles

This special issue is composed of five papers that span the period from the mid-18th century to the mid-20th century and deal with the most emblematic pathogenic environments: sailing vessels, marshes, the tropical zone, and poor urban neighbourhoods.

This special issue sets sail with Guillaume Linte's paper named "'The Salvation of the Seamen': Ventilation, Naval Hygiene, and French Overseas Expansion During the Early Modern Period (ca. 1670–1790)." This article highlights how pathogenic environments were conceived and reshaped in France using the example of naval hygiene. It examines the strategies designed and implemented to combat the "noxious" air of French ships, particularly through the regulations introduced since the end of the 17th century, and studies how they stimulated the search for technological solutions. Based on thorough research in the French naval archives, the author narrates the untold history of the first unsuccessful attempt to equip French ships with ventilators at the end of the 18th century.

59 Boudia & Jas (2019).
60 Beck (1992, p. 36).
61 Scott (2000, p. 36).
62 Bullard (1994; 2009); Zimring (2016).
63 Le Roux & Jarrige (2017). Ulrich Beck himself ultimately changed his mind on this matter: Beck (2010, p. 175).

Paul-Arthur Tortosa brings imperial history back onto terra firma in "Aetiologies of Blame: Fevers, Environment and Accountability in a War Context (France and Italy, ca. 1800)." Looking at a series of epidemic outbreaks during the Italian campaigns in the French Revolutionary Wars, he argues that military doctors supported French imperial endeavours by obscuring the army's responsibility in the spread of diseases. The author demonstrates that contagionism was used by civilians to accuse the French army of spreading diseases in what he calls an "aetiology of blame." Meanwhile, military officials attempted to absolve themselves of any such responsibility by focusing on unwholesome environments such as marshes, depicting diseases as unavoidable fatalities.

While Paul-Arthur Tortosa investigates the civilian–military divide in the Italian context, Marco Omes explores the lay–expert one, in a paper titled "'In aria sana': Conceptualising Pathogenic Environments in the Popular Press: Northern Italy, 1820s–1840s."[64] Drawing on a large corpus of technical and popular periodicals offering "useful knowledge" to a larger audience, he demonstrates that the popularisation of medical knowledge of pathogenic environments did not merely entail disseminating a set of stable, unanimous, and trustworthy medical doctrines; rather, it represented a crucial step in the making of science during a period in which medical theories were still varied and contradictory. Even though the popular press responded to pedagogical and informative goals, it mostly served to affirm the social usefulness of medicine and the legitimacy of health professionals' participation in political and social issues.

In her paper "'Some Typically African Risks': Safeguarding the Health of Italian Settlers During the Fascist Empire (1935–1941)," Costanza Bonelli examines fascist sanitary policies for the protection of overseas communities in colonised Ethiopia. Drawing on both the existing medical literature and archival sources, this article highlights the concepts and practices that underpinned the fascist project of the "reclamation" of the Empire—from the intensification of hygienic propaganda to the expansion of social security protection, which was extended to cover harm caused by tropical diseases. The author also investigates the transformations concerning the notion of acclimatisation, showing how the conception of the tropics as a pathogenic space remained widespread.

Finally, Lea Delmaire's article, "Locating the Health Hazard, Surveilling the Gecekondu: The Tuberculosis-Control Pilot Area of Zeytinburnu, Istanbul (1961–1963)," studies how poor and informal urban settlements have been portrayed as unhealthy. Yet, the stigmatisation of the population lies behind the stigmatisation of the area; the medical narrative tended to focus on individual and biological aspects, to the detriment of social or environmental factors that could contribute to making tuberculosis a matter of politics and not only of policies. Although stigmatised, *gecekondu* had an ambivalent status: transforming them into "pilot" zones was meant to integrate the dangerous population into an urban modern city.

64 Omes (2023).

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