

Keep Focusing on the Air

COVID-19 and the Historical Value of an Atmospheric Sensibility

▼ **KEYWORDS** Air, atmosphere, history of meteorology, atmospheric sensibility, COVID-19

▼ **ABSTRACT** Future historians writing about the COVID-19 crisis will need to pay more attention to the atmosphere and its role in the current crisis, for the atmosphere is connected to the current pandemic in multiple ways: the atmosphere transports aerosols; it changes as a consequence of the social crisis; air pollution and COVID-19 deaths seem to be connected; there is a triple crisis of 'oxygen-depriving politics'; and air travel has a large effect on the transmission of the disease. Increasingly, atmosphere scientists are contributing to the science of COVID-19. Dealing with the atmosphere is useful for another reason too: in the current age, atmosphere physicists and chemists have become key architects of the Anthropocene concept, and the meteorological sciences are increasingly claiming a stake in the environmental humanities. Environmental historians who attribute a larger role to the atmosphere should follow recent trends in the larger 'geohumanities', a new field that has exported the meteorologists' atmosphere into the humanities. At the same time, environmental historians could also benefit from engaging with the history of knowledge about air, not just late modern meteorology, but also early modern physics and chemistry, and the pre-nineteenth century medical sciences that were less hesitant about dealing with the air. Historians should acquire what I call an 'atmospheric sensibility' by looking at the sensibility of atmosphere scientists of the past. Obtaining this sensibility entails observing the way in which meteorological experts have used this knowledge to expand their discipline, in both the scientific and public realm. This knowledge can then be put to use to both create and strengthen specific themes in the environmental history of

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health. Areas of research could include, among many other possibilities, the difference between indoor and open-air work, or the importance of respiration, physiology and lung medicine in history. First acquiring and then deepening our atmospheric sensibility will provide a better understanding of the environmental history of health and pandemics in the current geological epoch.

Introduction

As the foremost experts of the atmosphere, meteorologists are increasingly working together with health experts in the current coronavirus crisis. For example, atmosphere physicists at the Scripps Institute for Oceanography are currently working on the local spread of the coronavirus through aerosols (Prather, Wang and Schooley, 2020).

The cooperation between atmosphere and health scientists during the pandemic forms part of a larger trend towards the integration of these fields: the public health of humans and non-humans are seen by some as connected through a new field of 'planetary health' as demonstrated by a new journal co-launched by the Rockefeller Institute and *The Lancet* (*The Lancet Planetary Health*, 2017).

Indeed, the atmosphere is bound up with the current viral crisis in many ways. Firstly, both the medium and matter of the atmosphere (Horn, 2018) contribute to how viruses spread: some viruses spread through aerosols more than others. Furthermore, it makes a difference to the spread whether you are indoors or outdoors (Thompson, 2020). In short, viruses have different environmental dynamics. Secondly, crises of this scale affect the atmosphere: there is less traffic, less business activity, and less pollution, even taking into account the enormous setback in the capacity to measure this altered atmosphere due to diminished air power (Nullis, 2020). Thirdly, there are medical feedback loops: there is the suggestive correlation between areas of air pollution and COVID-19 deaths (Cole, Ozgen and Strobl, 2020). Fourthly, there are the interrelated socio-political issues of 'lack of air' and breathing. Some writers have called 2020 the year of 'a triple crisis of oxygen' and see a connection between the coronavirus pandemic, the Black Lives Matter movement protesting against systemic racism and police brutality ('I can't breathe'), and on top of that the accelerating climate crisis with its pollution and recurring forest fires (Haegens, 2020; Mbembe, 2020). These issues have a shared environmental history: who has access to the air and who has not? Fifthly, air travel represents an important space for virus transmission, both of infected humans and zoonotic threats smuggled in cargo areas (Spevack, 2020).

Imagine the following scenario which encapsulates the (multifaceted) aerial dimension of today's era very clearly: a post-COVID-19 air-conditioned

plane equipped with essential meteorological instruments which is able to fly again after a quarantine stop, flying via so-called air bridges between countries that have been infected by the virus in the same way, with passengers trying not to exchange droplets and aerosols in their shared breathing space by wearing face masks, and possibly (illegal) animals carrying zoonoses in the cargo at the same time.

Environmental historians are ideally positioned to write about the multi-dimensional history of society, health, air and the climate. This may seem obvious, however, the alliance of health history and environmental history is relatively new and the current pandemic is largely seen as an infectious microbial disease instead of a 'toxic' disease caused by 'the environment'. For air pollution-related diseases (asthma) or allergies, the atmospheric dimensions are more obvious. It is important to introduce the atmospheric environment into microbial pandemic histories as well, in the same way that air pollution has been integrated into the history of toxic diseases (Mitman, Murphy and Sellers, 2004).

Environmental historians attempting to explain the pandemic should not only engage with the history of the interaction between humans and microbes, as well as between animals and humans (potentially leading to zoonosis), and engage in dialogue with microbiologists and animal health experts, but also grapple with the history of the atmosphere and the connected sciences of climatology and meteorology. It is *vital* that environmental historians of viral health crises do not just become transspecies historians but also atmospheric historians who study 'environmental mixtures' (Coccia, 2019, p. 54). We should all become climate historians of global air and breathing spaces (Mitman, 2007; Coen, 2018; White, Pfister and Mauelshagen, 2018).

This includes not only adding the meteorological atmosphere as the object of research, an interesting border where human and animals meet (Bauer, Güttler and Schlünder, 2019), but also appropriating some of the meteorologist's skills and practices, or more specifically, their atmospheric sensibilities. Instead of trying to dig deeper into the archives and through the soil into the earth, historians should start looking up and around themselves and study humankind's engagement with the air.

Taking Cues from the Atmosphere Scientists' Anthropocene

It would be very helpful to non-meteorologists (including health experts but historians of crises too), to consider how meteorologists look at the COVID-19 crisis and at how they might have done so in the past. However, before dealing with the importance of acquiring an atmospheric sensibility, I will show why there is another reason why we need it, one which relates to the current pandemic only indirectly.

Historians have almost entirely ignored the important role both air and the atmosphere have played in the history of the twentieth- and twenty-first centuries and have lost ground to other experts making claims on the past as a result. Meteorologists with a keen eye for atmospheric dynamics are increasingly framing the way we look at the historical development of the global environment, thanks to the introduction of the concept of the Anthropocene. Although it is tempting to see this ‘geological epoch of humans’ as an incursion into the humanities by the *earth* sciences, this new epoch was pin-pointed by *atmosphere* scientists. The Anthropocene was put forward by atmosphere chemist Paul Crutzen, together with limnologist Eugene Stoermer (Lenton, Dutreuil and Latour, 2020; Steffen et al., 2020).

This should not be a surprise to historians of the sciences. Ever since the meteorologist Alfred Wegener introduced his theory of moving continental plates in the early twentieth century, atmosphere scientists have led the way in challenging the geological monopoly of explaining the historical dynamics of the earth (Oreskes, 2001; Greene, 2015). After the World Wars, atmosphere scientists were the leading architects of the ‘earth system science’ and the Gaia-concept, expanding into the space of the life sciences in a profound way (Lenton, Dutreuil and Latour, 2020; Steffen et al., 2020).

Just like geologists, historians have been hesitant to adopt the concept of a new epoch wholeheartedly. Indeed, historians have been trying to take back the initiative by suggesting alternative Anthropocenes more rooted in the research practices of human history, such as the *Capitalocene* and the *Plantationocene* (Bonneuil and Fressoz, 2015; Haraway, 2017). However, instead of ‘going against the grain’ one could also critically go ‘along the grain’ (Stoler, 2010), and actively acknowledge the atmospheric element of this new epoch.

Encroaching too much on the terrain of meteorology should not be feared: if meteorologists can work on history, historians can work on the atmosphere. In fact it is positively necessary because the current pandemic is an event of atmospheric proportions.

A Poetics of the Air?

Historians need not reinvent the wheel to do this but can get their inspiration from the new field of ‘geohumanities’, a sub-branch of the environmental humanities in which geography, international relations (geopolitics) and art have taken the lead. Human geographers and artists have shifted their attention to the air as an important medium and matter for the humanities. Their goal is nothing less than a ‘poetics of the air’ (Adey, 2015; Engelmann, 2015; Nieuwenhuis, 2016; Ford, 2018; Horn, 2018; McCormack, 2018). Sasha Engelmann, Marijn Nieuwenhuis and Derek McCormack, among others, have significantly conceptualized and enhanced the ways that humanities scholars can deal with the air, and have asked important questions to drive new forms of research. They have worked on (the history and current practice

of) radio-based weather-sensing, drone violence and balloons as ‘atmospheric things’, with their own dynamics and epistemic effects. What kind of space is air? How does working with air affect us? What does it mean if air envelops us? Are there different cultures of air? If air is not an element, what are the consequences of it being a variable mixture?

Artists such as Tomas Saraceno even speak of an ‘Aerocene’ (Rizzo et al., 2016), and whereas Saraceno uses this concept to imagine a possible (somewhat utopian) future, historians could borrow it to analyze the history of the current age that started with the invention of the balloon, the airplane and gas warfare. It is even possible to speak of a global ‘atmopolitics’ (Tironi, 2014) having existed since the early 1900s. The German philosopher Peter Sloterdijk argues that the modern age began in 1915 in Ypres when the Germans first used chlorine gas on the Belgian front (Sloterdijk, 2009). One should not ignore the relationship to medical history either. Only a few years later the 1918 flu pandemic wreaked havoc on the lungs of the world, one which saw many soldiers and civilians being killed by bacterial pneumonia in the slipstream of the viral attack. Just like 2020, the years 1915–1918 were an ‘airquake’ (*Luftbeben*), to use Sloterdijk’s words.

Some historians of meteorology have recently taken the initiative of launching the new field of the ‘atmospheric humanities’ (Jankovic, 2018) in order to further conceptualize the air in historical research. Unfortunately, COVID-19 postponed the opening conference planned at Syros in Greece in July 2020 (Jankovic and Vlahakis, 2020). Then again, the tentative list of almost fifty papers due to be given at this conference (representing as many ongoing research projects), gives hope to the idea that the environmental history of the air will soon be able to emulate the richness of other new fields of environmental history that have successfully challenged land-based history, such as ‘the ocean’ and ‘outer space’ (Rozwadowski, 2013; Maher, 2017).

Nonetheless, although the build-up of a new subfield of aerial history is necessary, we should not forget the fact that it must start with the acquisition of an atmospheric sensibility and that all environmental historians (and especially those dealing with public health) should acquire such a skill.

Atmospheric Histories and Sensibilities

If environmental historians are to adopt a set of atmospheric and meteorological ‘sensibilities’ more wholeheartedly, it seems clear that one sensibility has absolute priority: being perceptive about the workings of the air and atmosphere around us.¹ Historians of meteorology have shown how, during

1 My goal here is not to further interrogate social ‘sensibilities’ as phenomena themselves, but take at face value the idea that all scientists have specific sensibilities and that different scientific cultures have their own sensibilities and ‘epistemic virtues’ (van Dongen and Paul,

the last few centuries, meteorologists have become leaders in knowledge about the atmosphere through the development of many ways of reading and experimenting with air, not just with classical reading instruments such as thermometers, barometers, hair-hygrometers and aspirations-psychrometers, but also with air pumps, sky observations, log books, cloud atlases, weather balloons, satellites, datasets, and ice-core measurements. They have studied not only the layers of weather, but also the higher stratosphere above it, the particles that travel through it, the microclimates in our cities and bodies, indoors and outdoors. They have dealt with aerodynamics and ventilation, not by studying it outside, but also by recreating them in wind tunnels (Anderson, 2010; Fleming, 2016; Coen, 2019; Richter, 2019).

Do we need to import these instruments into environmental history? Environmental historians of health should not use these meteorological instruments themselves or try to become meteorologists, rather, they should analyze how those meteorologists started bringing their aerial analysis into the domain of public health in the past. When writing about the history of a specific disease it would be fitting to also look for meteorologists in the vicinity and consider how they changed the research field. In many areas of health where air was involved, meteorological experts became indispensable as ‘obligatory points of passage’ (Callon 1986), sometimes being recognized as experts sometimes not.

Ozon and Stratosphere in the 1930s

Taking my own research on the history of German atmosphere physics as an example, a foundation for ‘research on the border between health science and meteorology’, the *Württembergische Gesellschaft zur Erforschung des Grenzgebietes zwischen Heil- und Wetterkunde*, was founded in Stuttgart in 1928. At that time, many physicians and health spa directors in the region were looking for the physical foundations for their popular natural sunlight and open-air therapies for all kinds of diseases, including tuberculosis (Dorno, 1924). This society explicitly invited the expertise of meteorologists and weather stations.

In 1931 the society asked the Stuttgart cosmic ray physicist Erich Regener to talk about the stratosphere, the ozone layer, and its role in filtering the sun’s ultraviolet rays.² This talk was to lead to a paper, published thirteen years later, after the Second World War, on the ‘photochemical climate’ as a result of the interaction between health, biological life and the atmosphere (Regener, 1946). As an atmosphere physicist his instruments gave him an

2017), which can transfer from one field to another. A wealth of literature exists about the senses and sensibilities, especially in chemistry, but also in the histories of nature and climate science (Roberts, 1995; Dettelbach, 1999; Golinski, 2011).

2 ERP-AMPS (Berlin), II.Rep.37.10, public lecture May 30th, 1931.

advantage: he had become an aerial expert because of the measurements of upper air radiation he had been able to carry out with weather balloons which had instruments attached to it. Because of his enhanced atmospheric sensibilities, he was able to contribute to medical therapy. His conclusion that natural radiation in the atmosphere varies (time of the day, latitude, altitude, etc.) was crucial knowledge for medicine.

Not only was the knowledge of the stratosphere of interest to medical scientists, it was weaponized during the Second World War. Although working on the periphery of the Third Reich because of his wife's Jewish ancestry, Regener contributed to Germany's war efforts at the Kaiser Wilhelm Society Research Institute for the Physics of the Stratosphere in Friedrichshafen, cooperating with Wernher von Braun on developing launch paths for his V2 rockets.

Environmental historians could use such historical cases to write about the interests of meteorologists in the current pandemic. If the atmosphere (and in this case, not the stratosphere, but the micro-atmosphere around us) is important in the global transmission of the virus, what kind of knowledge are we able to gain and what kind of cooperation between medics and atmosphere scientists can we expect?

Air Pump

The history of the twentieth century shows that atmospheric knowledge had by this time become an 'external' field of science that was not part of regular medicine. Doctors needed atmosphere scientists to back them up but atmosphere scientists were free to make their own alliances as well, often, but not always, working in the interest of public health. This was the result of a divergence between medicine and the atmosphere sciences in the nineteenth century.

The history of health and the history of atmosphere physics should not be regarded as two separate disciplines that intermingled every now and again. Many centuries before Regener was even asked to be an external expert, physicians had already worked with air themselves. Only in the late nineteenth century did air develop a bad reputation within medicine and was largely left to the fields of meteorology and climatology because it had become synonymous with 'outdated' views on disease-ridden miasmas. Doctors in the health spa industry were seen by medical contemporaries as working dangerously close to quackery. Theories that saw the air as the main transmission of disease were contrasted to more modern views of microbial transmission of disease (Worboys, 2011).

Luckily, historians of medicine have for a long time tried not to copy this rather condescending approach. Scholars working in the history of 'medical meteorology' and 'medical geography' have even tried to go beyond this dichotomy and have realized the continuing historical importance of the air

as matter and medium in medical and environmental history (Skydsgaard, 2010; Mitman and Numbers, 2016).

Environmental historians of health looking for atmospheric skills can be inspired by the early modern period as well, when atmosphere science, medicine and politics formed a more integrated domain (Jankovic 2010). In order to use the history of science and medicine for the sake of an environmental history of air, let us consider *Leviathan and the Air Pump* by Steven Shapin and Simon Schaffer (1985). This classic work in the history of science analyzes the simultaneous construction of Restoration politics of controlled dissent, and Robert Boyle's chemistry and pneumatics in the context of the establishment of the Royal Society in 1660. Shapin and Schaffer analyze how Robert Boyle's seventeenth century air pump experiments demonstrated to his contemporaries that vacuums can be created. Boyle used innovative literary technologies and his social network to successfully outcompete the 'plenist' philosophy of Thomas Hobbes, the well-known author of *Leviathan* (1651). Hobbes responded to Boyle's experiments in his *Dialogus physicus de natura aeris* [A Physical Dialogue on the Nature of the Air] (1661-1668), in which he claimed there is no such thing as a vacuum and that all space is full of matter, but his critique of Boyle's pneumatic experiments was not effective: nowadays, Hobbes is not fully recognized as a *natural* philosopher anymore, let alone a philosopher of the nature of air.

Shapin and Schaffer's work was not taken up as a starting point for new environmental histories of air, but instead mainly steered the history of science field further towards the realization that the scientific and political are co-evolving processes. What would happen, however, if we re-read *Leviathan and the Air Pump* as a manifesto ('air matters!') for environmental historians of knowledge?

In the centuries following the so-called Scientific Revolution the history of science and medicine then becomes a political story about the knowledge and control of the air: working both outdoors and indoors, suffocating birds, attaching psychrometers to weather balloons, spraying napalm, building and critiquing 'satanic mills', making cloud atlases, building satellites to predict hurricanes, climbing mountains with oxygen masks, patenting ventilators and proposing hospitals with air conditioning. The history of aerial science is the history of those who were able to sense and 'master' the air before others were able to do so.

This is what environmental historians should take on board: knowing the atmosphere in history means knowing how meteorologists played a central role in the history of health and politics in general; how scientists and health experts generally have tried to separate and reintegrate knowledge in specific compartments, closing and opening up new research questions. In the same way, future historians of COVID-19 should study the role of atmosphere physicists and chemists in the making of aerosol policies, and their political relations with medical specialists, while also taking into account that some experts will not always look at the atmosphere and that others will not always look at human health.

Related Sensibilities

Is it possible to go beyond the necessary task of 'following the meteorologists' in history in order to understand the relationship between health and the atmosphere? Should we not bring atmospheric sensibility to a higher theoretical level? I think there are two promising thematic directions that could do this.

First, history has an 'outdoor' and an 'indoor' aspect. This has been well-researched by historians of environmental science who have pointed out both the importance and historical under-valuation of field work in the history of knowledge (Kuklick and Kohler, 1996; Vetter, 2011; Raby, 2017). Their conclusion is that all sciences have both exterior and interior elements and correspondingly messy histories. Environmental historians closely following historical meteorologists, however, can further develop this by stressing not only the difference between working inside with artificial air conditioning and working in the 'open air', but also the historical development of these two working environments. The dynamics of interaction between humans and animals, plants, microbes and the atmosphere, are completely different inside and outside. The contrasting histories of clinical control and outside 'realities' should be a major topic for the future history of the environment.

Second, as mentioned above, studying the air also means studying breathing, not just the atmospheric layers above us. We should think about investing more in environmental histories of respiration. An important starting point forms Gregg Mitman's study on 'landscapes of allergy' and the connection between allergies, economies, medicine and botany (Mitman, 2007).

These two themes are connected. Vanessa Heggie has shown how the history of physiology and biomedicine also means studying the practice of scientific expeditions to the Himalayas and the (Ant)arctic, of scientists learning to breathe in extreme environments and bringing back knowledge to create new physiological technologies, such as ventilators and lung machines (Heggie, 2019). It is a small step from the history of field work in the mountains via space exploration and the history of biological life support (Höhler, 2010) to the history of COVID-19 patients on life support.

Watching the Air (Experts)

To conclude: what should environmental historians do in this geopolitical age of oxygen deprivation and atmospheric politics? The current trend in the environmental humanities is to focus on 'landing on earth'. In recent studies, the sociologists of science and environmental-political philosophers Donna Haraway and Bruno Latour have both turned to the idea of Gaia (Haraway, 2016; Lenton, Dutreuil and Latour, 2020).

In my opinion the mission of environmental history in the Anthropocene is not simply to get our feet back on the ground as this has been the mission of

the discipline for decades now. The goal of environmental history should also be to explain why the ‘earthbound’ (people, animals, plants and microbes) keep ‘launching’ into the atmosphere and why the air is such an important agent in human history, either directly through aerosols and air travel, or indirectly, as the object of research of the successful disciplines of meteorology and atmosphere physics. A good place to start is to follow those who have studied the atmosphere from the start, even if their focus was not human health. Those scientists who know the atmosphere have, for decades, set the agenda for others, including those who deal with humans alone. Environmental history should take note.

We should watch both the air, and those experts who have been doing precisely that for centuries, more closely.

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